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XXXVI

RAILWAY RATES AND COST OF SERVICE



# RAILWAY RATES AND COST OF SERVICE

BY

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## **RAILWAY RATES AND COST OF SERVICE**



# RAILWAY RATES AND COST OF SERVICE

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## CHAPTER I

### “VALUE OF SERVICE” VERSUS “COST OF SERVICE” IN RATE-MAKING

WHILE the procedure of effecting changes in railroad rates has become highly standardized in this country, there are no fixed standards by which the rates themselves may be compared or tested. A large proportion of freight rates, like Topsy, “just growed”: they resulted from the constant pulling and hauling of economic forces, which operated freely before the time when Government regulation began to crystallize rate relationships.

Before the period of system-building ended, some twenty or thirty years ago, competition was much keener than to-day. Changes of alignment were constant, new territories were being opened up, and all was in a state of flux; while the prevalence of rebating and the absence of governmental restraint tended to encourage an experimental policy in rate-making.

The slow but cumulative growth of public resentment against rebating, particularly in the granger States, together with the failure of State commissions and the delay of court procedure, forced Congress to enact a Federal law in 1887. Federal regulation has practically eliminated the most arbitrary and dangerous feature of the old rate system, rebating in its various forms. But the remaining rate structure has not been greatly altered, for the general mechanism of rate-making — the three territorial classifica-

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tions, the percentage tariff system in the East, and the long-and-short-haul practice in the South and West — has only been partially modified by the Interstate Commerce Commission. The gradual solidification of our railroad system, the adaptation of industry to the existing rate structure, and the red tape required to effect detailed changes in rates, have combined to preserve substantially a system of rates which had grown up under haphazard conditions. This result has doubtless had its advantages in stabilizing industrial relationships, but the question remains whether industry and society can function with the greatest efficiency under a rate system of such artificial origin.

Prior to 1910 the problem of rebating was an outstanding feature of railroad rate regulation. That evil having been brought under control, the road lay open to a systematic overhauling of the whole rate structure — in other words, the setting-up of standards by which the individual rate should be fixed. But before anything tangible in this direction could be accomplished, a new problem arose which engaged the best efforts of the Commission. The gradual fall in the purchasing power of money, continued since 1896, had offset the many advantages the roads had gained through rate stabilization and traffic growth. The question of raising rates as a whole to meet changes in the cost of transportation became the railroad issue of the day. The further economic changes brought about by the war and its aftermath have made the new issue dominant up to the present time, so that the more fundamental task of studying and revising the rate structure in its detail has been somewhat neglected.

The rate structure is of greater importance in our social scheme than is generally realized. It controls to a considerable extent the localization of industry and the distribution of population. It has much to do with the economy of large-scale production, which to a considerable extent means large-scale marketing. These facts are realized by

most students of transportation, and sooner or later the problem must receive the public attention which it deserves.

In studying rate relationships, since there are no absolute standards available the method of comparison has usually been adopted. Important differences in rates, not justified by variations in the amount of transportation work performed, are thus discovered, and these are said to be *discriminations*. Discriminations may exist as between whole services, such as freight, passenger, mail and express;<sup>1</sup> or between goods destined for domestic or foreign consumption;<sup>2</sup> or between distance tariffs, as instanced by the "long-and-short-haul" system, where the rate for the short distance may be even greater than for the longer; or in the classifications and class rates for different commodities. A freight charge based both on the classification of the commodity shipped and on the tariff between the points of shipment might involve two or more kinds of discrimination.

Passenger fares do not present any special cases of discrimination, unless passes for employees, half-fare rates to religious workers, and low mileage rates for commutation cards be regarded as such.

Discrimination in freight rates is commonly defended on

<sup>1</sup> The Interstate Commerce Commission several years ago took the view that passenger rates were unduly low, discrimination against the passenger service having existed for many years as a result of passenger fare laws passed by State legislatures during the period of public hostility toward the roads, and a readjustment of fares was therefore ordered. Later results indicated that the passenger service had become more remunerative than the freight service.

The railroads contended for many years that discrimination existed in the railway mail service, the compensation for which had been fixed by the Post Office Department, and an increase in railway mail pay was finally obtained by the roads.

<sup>2</sup> Differentials, or low rates on export traffic, are a recognized feature of the present rate system, under the policy of promoting foreign trade. More recently, in order to develop business for our newly created merchant marine, Congress provided in the Jones Act for preferential rates on goods destined for export in American ships.

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the ground that the value of the service rendered does not necessarily depend upon the physical work performed. This contention applies more especially to discrimination in classification, for differences in distance rates are usually attributable to the factor of competition between carriers. This distinction is not always clearly brought out in discussions of rate theory.

Most critics of the present rate system (i.e., of the principle of discrimination as exemplified in that system) refuse to find in "value of service" a correct basis for rate-making. They contend that, while different economic values may result from the transportation of different goods under like conditions, the railroad has not created these values and has no right to utilize them as bases upon which to formulate rates. They argue further that under normal competitive conditions of demand and supply in industry the cost of the commodity or of the work performed is a most important element in any price-making, and that therefore *cost of service* should be the basis of railroad rates.

To this the proponent of the value of service theory replies that, even if discriminations in the rate system were originally unfair, industry and commerce have become fully adjusted and accustomed to the present basis because of its long-continued stability, and that "value of service" represents a real economic fact which cannot be ignored. To change the rate basis would be to work havoc with our industrial system. Moreover, transportation being essentially a unity, and a large part of the cost being joint or common to all the traffic, it is impossible (or at least impracticable) to find the specific cost of the service to set against any particular rate.

This is the issue in brief, and in order to study it in its details and ramifications, three steps seem necessary: first, a study of the work and policies of the Interstate Commerce Commission, and a brief résumé of recent rate regulation; second, an analysis of the rate theories advanced by stu-

dents of transportation; and third, a study of railroad operating costs as related to rates, and an examination of the various attempts made to develop a cost-accounting technique. We shall then be prepared to draw conclusions as to the efficiency of the present rate system in its larger economic and social aspects, and as to the programme which rate reconstruction should follow.

## CHAPTER II

### RATE POLICIES OF THE INTERSTATE COMMERCE COMMISSION: THE RECENT TREND TOWARD COST OF SERVICE

THE Interstate Commerce Commission has been slow to develop scientific standards or rules for rate-fixing, and Congress has given little help until recently. For many years the Commission assumed that "reasonable" rates meant rates fixed without special regard to the financial condition of the railroads.<sup>1</sup> The requirement that rates should be reasonable was thought to mean simply that individual shippers should be protected from rebates and unjust discrimination, and the Commission did not see any warrant in the Act under which it might approve changes of rates *en bloc*. Gradually a broader view prevailed, however, and in 1920 the vague test of "reasonableness" was superseded by definite statutory rules governing changes in the general body of rates.

While a fairly satisfactory method of regulating rates *en bloc* has thus been obtained, neither Congress nor the Commission has analyzed the theory of the individual rate with the care which it deserves. The Commission has, it is true, given some attention to various phases of rate theory from time to time, but no clear-cut set of principles has been built up. In the last decade, individual members of the Commission, notably Mr. Lane, attacked the problem vigorously, but the issue as to whether the individual rate should be based on cost of service or value of service still remains unsettled.

A brief historical review of the Commission's decisions

<sup>1</sup> The original Act to Regulate Commerce merely stated that rates "shall be reasonable and just" and did not define the meaning of the term "reasonable."

will indicate the rather desultory and inadequate character of these efforts.

Prior to 1906 the Commission had no power to revise rates except on the complaint of shippers. There were a surprisingly small number of complaints during the period 1888-1905, and a much smaller number of formal decisions, as indicated by the following figures:

Settled informally by mediation.....	3223
Settled by agreement, withdrawal, etc.....	492
Settled by formal decision.....	297
Total cases.....	4012

Almost all of these cases involved rates on some special commodity, or tariffs to some particular city or locality. No distinct body of precedent may be said to have resulted from the Commission's labors during this preliminary period of regulation.

The Commission, however, in its early efforts made some attempt to work out a general basis or theory of rate-making. In its first report appeared the following comment on cost of service and value of service:

On the system of apportioning the charges strictly to the cost, some kinds of commerce which have been very useful to the country, and have tended greatly to bring its different sections into more intimate business and social relations, could never have grown to any considerable magnitude, and in some cases could not have existed at all, for the simple reason that the value at the place of delivery would not equal the purchase price with the transportation added. . . . The charge for carriage would be greater than it could bear. . . . It was, therefore, seen not to be unjust to apportion the whole cost of service among all the articles transported, upon a basis that should consider the relative value of the service more than the relative cost of carriage. Such method of apportionment would be best for the country, because it would enlarge commerce and extend communication; it would be best for the railroads, because it would build up a large business; and it would not be unjust to property owners who would thus be made to pay in some proportion to benefit received. Such a system of rate-making would in principle approximate taxa-

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tion; the value of the article being the most important element in determining what shall be paid upon it.<sup>1</sup>

In the first statistical report of the Commission (1888), an attempt was made to determine the average cost of service for the freight and passenger services, the joint expenses being apportioned in the ratio of train-miles. This attempt was abandoned in 1893, however, and the statistician (the late Professor Henry C. Adams, of Michigan University, who remained with the Commission until 1910) thereafter paid little attention to cost of service in devising the system of accounting and statistical classifications adopted by the Commission in 1907 as the revised code of standard practice for all the railroads.

The Interstate Commerce Commission's attitude toward specific cost of service as a basis for rates was again summed up in one of its early decisions:

While cost . . . is an element to be taken into account in the fixing of rates, and one of the very highest importance, it cannot, for reasons well understood, be made the rate basis, but it must in any case be used with caution and reserve. . . . It is quite impossible to apportion with accuracy the cost of service among items of traffic. . . . This is so well understood the world over that the propositions, which from time to time are made in other countries to measure the charge of the carrier by the cost of the carriage solely, have always been abandoned after investigation.<sup>2</sup>

In principle the Commission was thus inclined to favor value of service in preference to cost of service, but Professor M. B. Hammond's study of the later decisions indicates that cost was a deciding factor in many cases, especially where some special comparison could be made as between rates and costs on different commodities.

Professor Hammond has analyzed the principal decisions prior to 1910, classifying them according to the rate-

<sup>1</sup> *First Annual Report of the Interstate Commerce Commission* (1887), pp. 29-30.

<sup>2</sup> *In re* petition of Louisville & Nashville R.R. Co., 1 I.C.C. 31; 1 I.C.C. 278.

making principle most emphasized by the Commission in each case:<sup>1</sup>

Competition (between carriers, sections, or producers) .....	36 cases
Value of commodity.....	37 "
Class and sectional interests.....	5 "
Cost of special service (including comparisons with other rates).....	23 "
Distance factors .....	14 "
Natural advantages of location .....	15 "
Fair return on original investment.....	14 "

All the above considerations in the regulation of individual freight rates fall under three main heads: (1) the desirability of maintaining competition — a basic principle not only of railroad law, but of common and statute law with respect to industry in general; (2) the value of the service rendered, for which various criteria may be set up, such as the value of the commodity, the special interests involved, etc.; and (3) the cost of the service, including distance factors, advantage of location, return on investment, etc. Summarizing the above decisions, we find that thirty-six were decided on the basis of competition, forty-two on value of service, and sixty-six on cost of service or comparison with other rates (which is in reality a substitute for cost).

In 1906 the Hepburn Law was enacted, because of a popular feeling that the railroad problem demanded more fundamental treatment. This Act gave the Commission power to prescribe maximum rates in any case where existing rates, upon complaint of shippers and investigation by the Commission, were found to be unreasonable. In 1910 the Commission's powers were again enlarged, and it was given power to suspend and investigate on its own initiative any rate increase proposed by the railroads, without awaiting specific complaint on the part of shippers.

<sup>1</sup> M. B. Hammond, *Railway Rate Theories of the Interstate Commerce Commission* (1910).

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Thus the work of the Commission was considerably broadened, and the opportunity was presented for a further examination of the basic theory of rates. In the Western Freight Rate Case of 1910, Commissioner Lane made a strong defense of the cost principle. He pointed out that with the zone tariff system in Eastern territory, with freight classifications based largely on weight, bulk, etc., cost of service was already used to considerable extent. He also stated his belief that specific cost could be determined within an error of five per cent, but presented no facts to support his conclusion.

Congress finally acceded to the Commission's repeated request for a general railroad valuation. The Commission evidently felt that the cost of service principle could not be successfully applied without more accurate knowledge of railroad investments than was obtainable from the companies' books. The work of valuation is still in progress.

In the modified classification of operating expenses effective in 1915, each individual account was divided into sub-accounts intended to show, if practicable, the division of the amount as between the freight and passenger expenses. The Commission also attempted to obtain a consensus of opinion among railroad accounting officers as to the best means of separating maintenance of way and structures expenses. Statistical Series Circulars Nos. 3 and 4 were sent to the carriers to ascertain their views on this matter. While the results of the questionnaire were being studied, the Western Passenger Rate Case began, and it became evident that other Commissioners shared Mr. Lane's views as to the possibility of working out transportation costs.

The problem of selecting methods and units for separating expenses was discussed in some detail in the hearings of this case. In its decision the Commission held that "the separation of maintenance of equipment, transportation and traffic expenses presents no insurmountable difficulties;

the separation of the expenses incident to the maintenance of way and structures, however, is more difficult."<sup>1</sup>

Although the 1914 revised classification of operating expenses provided for sub-accounts showing the division between freight and passenger services, exact rules for this division were not issued until July, 1915, and the first published figures were for the year ended June 30, 1916.<sup>2</sup> The division was not complete, the method of separation being as follows:

1. Direct separation between the two services wherever possible — that is, expenses related solely to one service or the other being entered in detail in the original records and summarized in the annual report made to the Commission.
2. Indirect assignment of remaining expenses made where possible, on the basis of certain rules promulgated by the Commission.
3. The remaining expense accounts, or portions of accounts, to be unassigned.

For the years 1917, 1918, and 1919, because of war-time conditions, the roads were excused from making any indirect assignments, since this involved a large amount of statistical labor. In 1920 the 1915 rules were revised (but without radical change) and the roads were again required to make indirect as well as direct assignments. Moreover, sub-accounts were to be kept for *all* the operating expenses, leaving no unassigned balance.

The statistical averages resulting from the classification of expenses now required have not yet served any practical purpose as regards reconstruction of the rate system on a cost basis. Nevertheless, they are of considerable interest as affording evidence of the possible development of railroad cost accounting. A detailed analysis of the figures will be found in Chapter XII.

<sup>1</sup> I. and S. Docket No. 600, p. 12.

<sup>2</sup> *Statistics of Railways* (1916), Table 38.

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As regards application of the cost principle to the regulation of rates as a whole, the Commission has made more rapid progress in developing technique and policy. Since 1910 it has gradually but surely developed the principle that rates *in the aggregate* should be fixed so as to yield a fair return on the railroad investment. This policy has now been incorporated in the Esch-Cummins Law. The slow and painstaking progress of the Commission in reaching this basis of regulation will be described in the chapters following. A study of the important decisions will supplement the valuable analysis of the earlier cases, made by Professor Hammond, and will picture in detail the gradual ascendancy of the cost-of-service principle.

For convenient reference and to avoid cumbersome detail in the chapters following, a résumé is here presented in tabular form, showing the docket numbers, dates, subject-matter, and decisions in the various cases to be analyzed.

The Intermountain Case and others of similar nature are not included in the study, for although of considerable importance they involved special problems of rate adjustment rather than the clear-cut issue of an advance in the whole body of rates, based on increased cost of transportation.



# SUMMARY OF ADVANCED RATE CASE DECISIONS

NAME OF CASE	DECISION NUMBER	DATE OPENED	DATE DECIDED	TERRITORY AFFECTED	AMOUNT
The Advanced Rate Case of 1910 — Eastern	3400	July 13, 1910	Feb. 22, 1911	Eastern Territory	General class rates. half of rates.
The Advanced Rate Case of 1910 — Western	3500	Ditto	Ditto	Middle Western States	General commercial rates.
The Five Per Cent Case	5860 I. & S. 333	June 21, 1913	July 29, 1914	Eastern Territory	A general reduction of some 15%.
Ditto	Ditto	Sept. 15, 1914	Dec. 16, 1914	Ditto	
Western Rate Advance Case	I. & S. 555 Part II, I. & S. 606	July 30, 1915	Dec. 18, 1915	Middle Western States	Increased modest minimum rates.
Western Passenger Fare Case	I. & S. 600	Mar. 1, 1915	Dec. 7, 1915	Ditto	Increased interest rates.
The Fifteen Per Cent Case	Ex Parte 57	Mar. 22, 1917	June 27, 1917	Practically all roads in U.S.	15% increase in rates.
Ditto	Ex Parte 57 (Supplementary hearing)	Nov. 15, 1917	Mar. 15, 1918	Ditto	
General Rate Increase Case of 1920	Ex Parte 74	About May 1, 1920	July 29, 1920	Ditto	Increased rates to make some compensation.

# THE INTERSTATE COMMERCE COMMISSION

CASE	SYNOPSIS OF I.C.C. DECISION	DISSENTING OPINIONS OF COMMISSIONERS
in all but one modity	No increase granted.	None.
in 200	No increase granted.	None.
case in (with ).	Increased rates (with a few exceptions) allowed in C.F.A. territory but not in Trunk Line or New England territory. Specific economies in operation and changes in rate structure suggested.	McChord and Daniels held that increase for all Eastern roads was justified: the latter was opposed to suggestions in respect to possible economies.
com- ase in weight,	Increases previously excepted in C.F.A. territory now allowed; all increases allowed in other territories except for rail-and-lake, coal and iron ore. (In later decision increases were also allowed on these commodities, excluding anthracite coal.)	Harlan believed roads had proved need of more than 5% increase, but favored revision of the rate structure rather than straight increase. Clements opposed to decision based only on earnings, etc., rather than on "reasonableness" of individual rates.
5% in fares.	About one half proposed increases granted; percentage increase in revenue not stated.	Daniels and Harlan favored general increase and advocated reform in procedure. Harlan suggested new rate structure based on zone system.
freight	About four-fifths of proposed increases granted.	Hall dissented, but without statement.
	Increase in class rates in Eastern Territory allowed; only coal, coke and iron ore rates raised in West and South.	Harlan concurred only that majority decision might be reached; regarded relief granted as inadequate. Meyer and McChord opposed increases.
t to g in- vest-	Full increases granted — no statement of reasons.	None.



## CHAPTER III

### REGULATION OF RATES AS A WHOLE: THE 1910 ADVANCED RATE CASES

THE two rate decisions rendered by the Interstate Commerce Commission on February 22, 1911, although quite similar in their general treatment of the issues involved, reflect the widely different views held by their respective authors — Commissioner Prouty in the Eastern Roads' Case, and Commissioner Lane in the Western Case. The former was concerned with the legal powers and duties of the Commission, while the latter considered the rate problem in its broader economic aspects. Both decisions, however, were entirely adverse to the railroads.

Commissioner Prouty centered his attention upon the concept of "reasonableness" as related to the individual rates involved, and held that the Commission could not, under the limited authority granted it by the Act to Regulate Commerce, consider the financial needs of the railroads as a reason for rate increases. But in the Western Case Commissioner Lane held that the railroads and the shippers were not interested so much in the specific rates on some two hundred commodities as in the general issue of railroad plans and needs. It is not clear to what extent the Commission realized the fundamental inconsistency of the two decisions. The narrower view of its duties expressed by Commissioner Prouty gradually disappeared in later decisions, however, as the necessity of protecting the interests of both the railroads and the public became more evident.

The Commission rejected the "plea for prosperity" advanced by the railroads. A general rate advance might permit the roads to place larger orders with the supply companies, but this would afford only an artificial and temporary stimulus to industry in general. The added burden

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upon shippers would soon offset the increased earnings of the steel and supply companies, and, while there might be a brief period of increased business activity, this would be more than offset by the lowered efficiency of an industrial system taxed by unreasonable railroad rates.

The plea of the railroads for increased revenues to support their financial credit was next considered, and the conclusion reached that, since the Commission's authority was limited to determining "reasonableness" in rates, the need of greater revenue could be considered only as a corollary, and not as a deciding factor. It was admitted that the industrial and commercial results of a rate increase should be considered, but the Commission ignored the question, "Do the railroads need greater revenue to enable them to improve their facilities and give *better* service?" — asking instead, "Are the railroads entitled to more revenue for the services which they are now rendering?" In the Western Case, it is true, Commissioner Lane took a more liberal attitude, but the majority of the Commission evinced little interest in the future constructive development of the transportation system.

In considering the railroads' plea for larger earnings to sustain credit, the Commission thought that it would be better policy for the Government to guarantee railroad bonds than to "bolster up" credit by means of a rate increase. The decline of the railroads' credit abroad was due to lack of Government control of railroad security issues, it held. Moreover, the roads had injured their own credit by pleading poverty in their propaganda to gain public support for a rate increase. The Commission admitted that interest rates on new security issues had increased, but stated that this applied to all industries and was not peculiar to railroad finance. Moreover, since revenues and dividends were greater than ever before, the Commission could not see the necessity of a further increase to support credit.

The railroads contended that it was necessary to increase

their surplus accounts in order to expand successfully and handle new business efficiently. They held that a considerable portion of betterment work should be provided for by direct appropriations from surplus, as under the well-known policy of the Pennsylvania Railroad to expend "a dollar for dividends and a dollar for betterments." Commissioner Lane gave qualified approval to such a policy. Improvements in the standard of service might well be paid for out of surplus, as this would enable the public to share in the benefits of such investment. But to use surplus to finance unprofitable extensions in new territory in order to build up future traffic would place an unjust burden on shippers in the original territory served by the railroad. Such a policy would also give the old established roads with large surpluses a monopoly of new development work. Moreover, if the new investments should prove unprofitable, the roads might seek a general rate increase to obtain a better return on the reinvested surplus. This would be unfair to the shipping public, which had paid high rates originally in order to give the road a surplus. Commissioner Lane stated the only justifiable uses of a surplus to be: (1) to pay dividends in lean years; (2) to meet losses due to obsolescence of plant; and (3) to take care of unproductive improvements — that is, improvements in service not resulting in increased gross revenue.

The Commission regarded the aggregate surplus of the railroads as ample to provide for these legitimate purposes. The figures were not analyzed in detail, but it was pointed out that surplus had increased nine times as fast as mileage.

The Commission next considered the adequacy of net earnings from the standpoint of constitutional rights — that is, as to the right not to be deprived of property or fair return from property without "due process of law." This involved (1) selection of a basis for valuation of railroad property, and (2) determination of the fair rate of return on such value.

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Various methods of assigning value to a railroad property, which had been suggested by the Supreme Court, were analyzed by the Commission:

1. *Original cost, as indicated by "book value" of the property* (the road and equipment investment account in the balance sheet). As the account had not been kept in accordance with any uniform rules prior to 1907, the Commission decided that this basis could not be used. (In later cases, however, the Commission used this basis.) In the Western Case, answering specific arguments presented by the Chicago, Burlington & Quincy Railroad, the Commission differentiated between the original cash investment and the amounts put into the property out of surplus earnings. This was in agreement with the previous analysis of the reasonable uses to which surplus could be devoted. It was held that, if the additional investment made possible by high rates in the past did not prove profitable, no railroad would be justified in asking for an increase in rates in order to obtain a good return on the reinvested profits.<sup>1</sup>

2. *Market value of securities.* The advantages of such a basis were examined by the Commission, but it was not adopted. Commissioner Prouty suggested that, since the railroads had been on a competitive rate basis during the past twenty-five years, the market value of their stocks and bonds might supply an approximate basis for estimating the fair value of the properties. No application of this idea was made, however. To have used such a basis would have "begged the question," inasmuch as the Commission was considering the reasonableness of the old competitive rates, as well as the proposed increases.

3. *Present cost of reproduction.* The Commission did not discuss this basis in detail. Congress had not yet acted on

<sup>1</sup> This principle has never been subsequently applied to valuation figures — possibly because of the accounting difficulties involved, and the delay in completing the general valuation of railroads ordered by Congress.

the Commission's recommendation that a general railroad valuation should be made, and this basis could not, therefore, be used. In the Western Case, however, the Commission stated that the "unearned increment" in land or other property values could not be fairly included. To this extent, at least, it rejected the "cost-of-reproduction" basis.

4. *Probable earning power.* Such a basis was considered both inexact and inconsistent as a test of rates, which in themselves would determine earning power.

While the Commission in these cases evidently cleared the way for later adoption of book value as a working basis of property value, no clear-cut conclusions were stated. It was decided to examine the general financial structure of some of the larger roads, but even this was not done systematically. The Commission noted the fact that about 1870 the stock of the New York Central had been "watered" to the extent of \$57,000,000. Adding to this amount six per cent dividends for a period of forty years, it was concluded that the present capitalization had been inflated to the extent of about \$177,000,000. The Commission added that "we cannot entirely close our eyes to bits of history like that above referred to."

Doubtless many other interesting "bits of history" might have been discovered had the investigations into capitalization been extended, but they would not have aided materially in arriving at a fair conclusion with respect to rates. In its later decisions the Commission did not search for other skeletons in the railroad closet, although the fact that scandals had existed continued to have some weight in its conclusions.

Taking up the problem of "fair return," the Commission stated as a preliminary requirement that the railroads must exercise reasonable efficiency in management and operation. Reasonable efforts toward economy should be made, and in this connection a wide difference in the locomotive

maintenance costs of different roads was pointed out. Good judgment would also have to be shown in the acquisition of leased properties, and the New York Central lease of the Boston & Albany was instanced as a serious blunder. The relations between the railroads and the supply companies, as indicated by interlocking directorates, were criticized by the Commission as tending toward monopolistic conditions and high costs for supplies.

The Commission also pointed out that, if the roads were to deserve a fair return on their property value, they must make a real effort to eliminate serious inconsistencies in the rate system. The one hundred per cent increase in the rail portion of rail-lake rates on wheat (the lake percentages having decreased) was named as an instance of such inconsistency.

Moreover, one service should not be made to pay part of the cost of another service. The freight service of the New York Central should not be exploited in order to pay for the building of a great passenger terminal. This vague allusion to the cost principle in rate-making was not developed in detail at this point, but the idea was more carefully analyzed in a later case.

Assuming that the railroads had fulfilled their general obligations in the matter of economy and efficiency, it was held that the rate of return on the fair value should be about as high as that obtainable from investments in industrial enterprises. The Commission thought that a stock paying five per cent dividends should sell in the neighborhood of par (speculative market influences being eliminated). Therefore, assuming that any individual railroad was not overcapitalized, its net income, in order to represent a fair return on investment, should provide five per cent on the common stock and, perhaps, two and one half per cent for surplus. No specific application was made of this conclusion, however, and it was not referred to again in later decisions.

The Commission also stated that, as a general proposition, the railroads' net income should be high enough to maintain transportation in a "high state of efficiency." But this statement meant little, for, as we have already noted, the roads were expected to exhibit evidence of efficiency as a preliminary to receiving a fair rate of return. The Commission apparently did not realize the inconsistency between these two statements. It wished to insure good service for the public, yet it forgot that, if the roads were to be punished for financial transgressions or errors of policy, the public would likewise suffer. Moreover, the Commission would not admit its own responsibility to help sustain the credit of the railroads.

In further support of its general conclusion that increased rates were unjustified, it was pointed out in the Eastern Case that the railroads had already enjoyed large increases in revenue since the Commission had undertaken the regulation of rates in 1888. The practices of rebating in its various forms had been almost entirely destroyed, and payments for special services such as cartage and storage, reconsignment of goods *en route*, etc., had been put into effect. Increases in individual commodity rates had also been allowed at various times.

Finally, while the roads had not gained the full benefit of the principle of "increasing returns" in the immediate past because of offsetting factors, the Commission believed that in the near future the normal tendency toward decreasing costs would be resumed. Traffic had increased faster than the capital investment up to the year 1907, when congestion occurred. Since that time the tendency has been reversed, so that the enlarged facilities should now be sufficient to handle a considerable further increase of traffic. Increases in wages and prices had up to 1910 offset economies which had resulted from increased business, but the Commission did not believe that the tendency to such increased costs would continue. Further large opportunities

for economy would lie not so much in increased train-loads as in the adoption of new methods of scientific management. However, it was admitted that the congestion caused by insufficient terminal facilities raised a serious problem.

The Commission suggested that, if its forecast as to a decline in costs should not be borne out by events, the railroads might again present their application for increased rates.

As has been noted in Chapter II, Commissioner Lane's decision included a strong argument in proof of the cost theory of rates as against value of service or "charging what the traffic will bear." But no concrete rules or principles were worked out, and such cost data as had been presented by the roads were not regarded as supporting the argument for increased rates. In this connection the Commission also pointed out that some of the rates under review in the Western Case were twice as high as others in effect east of Chicago, which fact seemed to indicate unfair distribution of costs.

While the decisions in these cases give evidence of careful investigation and analysis, they indicate throughout that the Commission was influenced by the existing general prejudice against the railroads. It entirely failed to realize its own obligation to develop in practical detail the general principles of rate-making which it desired to force upon the roads. The railroads could hardly be expected to undertake a complete revision of their rate systems — with the resulting disturbance to railroad earnings and finance — without definite instructions from the Commission. The latter apparently possessed neither the authority nor the practical experience to enforce its views except through the dangerous course of withholding the financial aid required to maintain the country's transportation system in a sound condition. It is only fair to add, however, that the difficulties in which the railroads became involved in the

ten years following were due largely to the unforeseen trend of world events, and that the Commission's 1910 decisions were not a deciding factor in the situation which developed — though had the roads received an increase in rates at this time they would have been more strongly fortified to meet the stress of coming events.

## CHAPTER IV

### TERRITORIAL RATE REGULATION SINCE 1910: DEVELOPMENT OF "FAIR RETURN ON INVESTMENT" AS A BASIS

IN 1913 the railroads decided that the time had come to take advantage of the Commission's offer to reopen the question of rate increases, provided the 1910 forecast of conditions should prove inaccurate. Accordingly, on January 21, 1913, the roads in Eastern territory applied for a general five per cent increase in freight rates.<sup>1</sup> In the decision handed down July 29, 1914, only partial increases were allowed, but, about two weeks later, the European war having broken out, the roads asked for a supplemental hearing, and a more favorable decision was obtained December 16th.

The Middle-Western roads in 1914 also made application for increases in selected commodity rates, an increase in the minimum carload weight, etc. But as this case does not naturally accompany that of the Eastern roads, as did the Western Case in 1910, it will be analyzed separately.

#### THE FIVE PER CENT CASE

In the first decision in the Eastern or "Five Per Cent" Case, increased rates were, with a few exceptions, allowed in Central Freight Association territory (comprising the States of Ohio, Indiana, and the greater part of Illinois and Michigan), but not in Trunk Line or New England territories. It was held that the roads operating in Central

<sup>1</sup> While the case was officially referred to as "The Five Per Cent Case," the actual tariffs showed increases varying from three per cent to fifty-nine per cent, while certain classes of traffic were entirely unaffected. However, the average increase in gross revenues was estimated to be about five per cent, and a great majority of the rates were raised by this uniform amount.

Freight Association territory earned too small a return upon their investment, while the average earnings of the other Eastern roads were deemed sufficiently high.

The Commission suggested, as an alternative method of obtaining larger net income, the adoption of various measures for efficiency and economy. The suggestions were largely the result of research and investigation by Mr. Louis D. Brandeis, engaged as Special Counsel for the Commission. Various changes in the rate structure were also suggested as a means of increasing revenues.

In the decision on supplementary hearing (the outbreak of war having closed the New York Stock Exchange, and general alarm being felt as to the financial and business outlook), the Commission granted practically all increases previously withheld, excepting tariffs on joint rail and lake traffic, and rates on coal, coke, and iron ore. In a still later decision, however, increases were also allowed on the latter commodities, excluding only anthracite coal.

In the first decision, Commissioners McChord and Daniels held that an increase in rates for the whole of the Eastern territory was justified, and the latter also opposed the view of the majority with respect to possible savings through efficiency methods, especially on the ground that such measures would not afford any substantial relief for a considerable time.

In the later supplementary decision of the Commission this became the majority view, but the more conservative members dissented. Commissioner Harlan still favored a careful revision of the whole rate structure rather than a general increase in rates, and Commissioner Clements felt that a decision based only upon general financial and operating results exceeded the legal powers of the Commission, which were limited to determining the reasonableness of rates.

The first decision in the Five Per Cent Case covered much the same ground as the 1910 cases. Chairman Harlan

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began the argument against the roads by stating that inasmuch as the general system of class rates and basic commodity rates had been in effect for about twenty-five years a reduction rather than an increase would naturally be expected. This conclusion ignored the important fact that a considerable decrease in the purchasing power of money had occurred during the twenty-five-year period, but this point was emphasized in Commissioner Daniels' dissenting opinion. Commissioner Harlan also repeated the view that railroad investors could not expect a good return upon their investment so long as there was evidence of dishonesty, bad judgment, or inefficiency. The Commission's previous statement that existing rates or services must be proved unreasonable, but without regard to the financial needs of the roads, was repeated, but not stressed to the same extent as in 1910.

The railroads' arguments in favor of an increase in rates also consisted largely of a repetition of those expressed in 1910. Net operating income had declined in proportion to property investment, owing to recurrent wage increases, legislative requirements as to safety measures, and higher standards of service. The railroads' exhibits for the 1914 cases, however, indicated a considerable advance in statistical technique. Uniform results were compiled for all the companies involved, and the percentage of net return on the book value for all roads in Eastern territory was worked out for a period of years. A change in the standard form of the income account was introduced in order to separate railroad earnings from non-transportation income such as dividends, interest, and real estate rentals. Net operating income, reflecting the returns from railroad operations before fixed charges, was placed in relation to the book value of road and equipment, thus indicating the percentage earned on the investment. This simplified the problem of fair return on investment by automatically removing all questions relating to capitalization — questions which

had given the Commission much concern in the 1910 cases.

While the Commission was still reluctant to accept book value as the basis of railroad property valuation, they regarded it as the best available figure to test net operating income, and accepted the figures given by the railroads as sufficiently close to the facts. It was pointed out that, inaccurate as the average property account might have been prior to 1907, the accounting methods for making charges or credits to the account since 1907 had been carefully regulated, thus making the present figures somewhat more accurate than in that year.

The roads in their exhibits presented various averages of the return on investment, comparing different years and periods. The Commission pointed out that during the years 1900 to 1913, inclusive, the roads had enjoyed four periods of prosperity, ending in the years 1903, 1906, 1910, and 1913. Accordingly new averages to represent these periods were substituted for the averages the roads had presented.

The exhibits indicated that during the years 1900 to 1913 expenses had increased 133 per cent, revenues 110 per cent, and property investment 59 per cent. The Commission attributed the small increase in investment to advances in the art of transportation, as well as to greater traffic density. But the rise in the operating ratio had more than offset the decline in capital costs. The change in this ratio was due in part to lower receipts per ton- and passenger-mile, probably caused by increased length of haul, or by a greater proportion of low-grade traffic. While there had been little, if any, decrease in freight tariffs, passenger fares had been reduced by State legislation. The full crew requirement adopted by a number of legislatures, and various other measures for safety or sanitation, had increased transportation costs to some extent, although in the opinion of the Commission this was not a serious factor. Taxes had increased, and would probably continue to advance.

The Commission found that the decline in the percentage earned on investment from 6.25 per cent in 1907 to 5.36 per cent in 1913, together with the large increase in the funded debt, represented a dangerous tendency, and felt that it should help to solve the problem "so far as we legally may." But rates could only be raised in so far as they were "reasonable," and there were large differences as to costs and profits on different classes of traffic, which the roads had not analyzed with sufficient care.

However, the Commission found that there had been a considerable increase in the cost of conducting passenger service, while at the same time rates from this service had been reduced through legislative enactment, causing a loss in gross revenues estimated at \$18,000,000 for Central Freight Association territory. Reduction in fares had not been offset by anticipated increase in traffic. The roads had been unable to effect economies in the passenger service through increased loading, or by such efficiency methods as had been possible in the freight service. Passenger fares being a direct tax, while freight tariffs represented an indirect tax upon the consuming public, the tendency had been to place the burden of overhead costs upon the latter service, and this result should, in the opinion of the Commission, be corrected. The railroads early in 1915 took advantage of these conclusions by applying for an advance in interstate passenger fares, and gained a favorable decision.

With respect to the freight service, however, the Commission pointed out that the cost of various classes of traffic had not increased equally. For instance, the cost of less-than-carload traffic, involving the use of larger cars and expedited service, had increased faster than that of carload traffic. Again, many kinds of traffic, such as coal, were known to involve much lower cost of handling than other classes of traffic. Coal-carrying roads had always received a very small amount per ton-mile, yet they were all prosperous.

There were also wide differences in the character and profitableness of traffic in different portions of Eastern territory. This was a natural result of the varied character and density of traffic, the distribution of industry, etc. The roads in Central Freight Association known as "Group 3," had a much lower net operating income than the remaining C.F.A. roads, while C.F.A. territory as a whole had much lower income than the Trunk Line and New England territories. The comparatively small earnings in C.F.A. territory were found to be mainly due to the low average ton-mile revenue, and to the smaller proportion of tonnage in products of mines. The class rates were found to be lower in this territory than elsewhere, and commodity rates were in most cases lower than the class rates. The Commission, therefore, decided that the five per cent increase for both class and commodity rates in this territory was justified, except as to certain specified commodities. However, it called upon the C.F.A. roads to readjust their whole tariff structure, the changes to be submitted in a later case.

The Commission decided that the "financial condition" of the roads outside of C.F.A. territory did not warrant any increase in rates, but it was pointed out that many roads in Trunk-Line territory would receive some relief through the C.F.A. increases, and the New England roads were "being cared for locally."

It is evident that the cost idea with respect to rates as a whole was predominant, though confusion of thought still remained as to its application. The issue remained obscure as to whether rates as a whole could legally be raised if total costs (that is, net income) justified it, or whether rates could be raised only in piecemeal fashion as individual cost studies warranted. But the Commission was gradually working toward a policy of territorial rate regulation and away from the idea that detailed adjustment of rate relationships was involved in "reasonableness."

The Eastern Rate Case was resubmitted by the roads October 30, 1914, and decision quickly obtained on December 16th. The Commission, in justifying the reversal of its former decision, pointed out that (1) the European war had produced a serious situation; (2) complete returns for the year ended June 30, 1914, were now available; and (3) the results of the original order could now be studied.

The figures for the year 1914 indicated that net revenues had fallen below those of any year since 1908, though property investment was \$1,309,000,000 greater than in that year.

The Commission was again inclined to belittle the plea of the bankers that railroad credit should be saved, holding that it could not decide such matters as "*in loco parentis*," but admitted, nevertheless, that the war had undoubtedly had some adverse effect on money rates.

The Commission approved the increased rates somewhat grudgingly, and with the requirement that the roads should continue to work upon the constructive methods of increasing net revenue proposed in the earlier decision.

#### THE WESTERN CASE, 1915

In this case the carriers, following the advice given by the Commission in previous decisions, did not apply for a general horizontal rate increase, but instead selected certain commodities which they asserted were not paying their fair burden of costs.

The shippers in opposing these increases based their argument upon the general contention that the roads did not need larger net revenues, and that the accounting statements did not fairly reflect the financial condition of the roads, principally because large amounts had been charged to expenses for depreciation and abandoned property. The Commission did not sustain this point, although in the Eastern Case it had itself made a similar charge against the roads. The issue was here disposed of with the state-

ment that before the adoption of a standard accounting system the roads had frequently charged additions and betterments to expenses instead of to surplus.

After examining all the financial data presented by the roads, the Commission stated that the return on investment had decreased from a five per cent average for 1901-07 to a four and one half per cent average for 1907-14, and that "the trend is significant." The increase in costs, resulting in a ten-point rise in the operating ratio between 1901 and 1914, was found to be due to natural economic causes, as there did not seem to be any evidence of railroad mismanagement on a large scale. The Commission also professed some alarm at the increase in interest rates and in the proportion of bonds to stock outstanding.

The Commission, having proved to its own satisfaction the need of additional revenue, now proposed two queries:

- (1) Can the carriers be treated *en masse*?
- (2) Can the rate structure be regarded as a unit?

The first question was answered in the affirmative after considering precedents established in other decisions. It was also pointed out that, since no attempt had been made by shippers to show that geographical differentiation "was possible or desirable," the Western territory might be treated as a unit. In the Eastern Case, it will be recalled, the Commission had selected C.F.A. territory as differing in characteristics from other territories.

With respect to the second question, the Commission stated that the shippers disagreed with the railroads as to which commodities should pay a larger proportion of cost of service. Cost accounting had not yet been developed as it needed to be, and competition and various factors other than cost still controlled rate-making. The Commission recognized the necessity that the roads should take the initiative in selecting the commodities for which increases in rates should be requested. But the Commission, while allowing some latitude in the matter of profits to the rail-

roads, declared that it would be bound to reject such increases as seemed inconsistent with the ability of shippers to pay.

In connection with the question of cost accounting the Commission presented certain tables prepared at its request, showing theoretical rates of return based on cost of service plus an allowance for the value of the commodity. However, the table was of little practical significance and no further reference to it was made. It is merely of interest as an attempt by the Commission to reconcile cost of service and value of service.

While admitting its handicap in the absence of specific cost figures, the Commission proceeded to analyze with some care the proposed rates on various commodities. An advance on grain products was refused because the statistical evidence was not satisfactory and because specific tariffs and geographical factors were not taken into account. Live-stock rate increases were not allowed because intra-state rates were already so much below interstate, and to increase the difference would mean discrimination. It is unnecessary to review the grounds on which the Commission passed upon the remaining groups of commodities, as no new principles were introduced.

Commissioner Daniels, as in the earlier Eastern decision, offered a vigorous dissenting opinion, stating that the Commission had not squarely met the issue of inadequate returns, and that it had been too niggardly in allowing increases. He regarded the question of discrimination between intrastate and interstate rates as a matter in which the Commission should take the lead and make the States follow.

He felt that the Commission was still unduly prejudiced against the roads and that, if "bad" roads were to be punished, this should be done directly and not in connection with a general rate case.

Commissioner Harlan also dissented, stating that the

roads had accepted in good faith the suggestion in the Eastern Case that they limit the proposed increase to specific commodities, and that the Commission had quibbled in refusing certain increases. He urged that a practical beginning should be made in working out a uniform classification, and a block tariff system in some such form as that prescribed in the express case.<sup>1</sup>

#### THE WESTERN PASSENGER FARE CASE OF 1915

The decision in this case also was largely favorable to the railroads, not because of a genuine change of attitude on the part of the Commission as to the railroads' needs, but rather because the application was in agreement with a theory frequently expressed by the Commission in its earlier cases — that is, that passenger rates were out of line with freight rates and that the freight service as a whole had for many years been taxed to help support the passenger service.

Moreover, this case gave the Commission an opportunity to try out its new theories as to cost accounting. While the decision opened as usual with a general statistical analysis of earnings, the greater part of the text was devoted to an analysis of methods for dividing joint cost of service (particularly maintenance of way and structures expenses) between the freight and passenger services. A detailed discussion of the Commission's efforts in this direction will be presented in Chapter XII, which deals with the technical problems of railroad cost accounting. In general it may be stated that the Commission's efforts to work out a basis for determining costs were only partially successful, but the result of its study undoubtedly stimulated practical interest in the problem.

#### THE FIFTEEN PER CENT CASE OF 1917

Although the decision in the Fifteen Per Cent Case of

<sup>1</sup> 28 I.C.C. 131.

1917 involved a large increase in freight rates throughout the United States, the text of the Commission's decision forms a much smaller document than most of the earlier decisions which we have analyzed. The detailed analysis of individual roads' accounts and of particular services and rates, which characterized the earlier decisions, was abandoned in favor of a general study of railroad earnings and credit needs. Earnings were examined according to the three great rate territories of the United States — a much broader basis than ever previously adopted.

The earnings of the carriers for the month of February, 1917 (the final month for which exhibits had been filed), were so bad that, in the words of the Commission, "they may well have startled the railway executives." The railroads were just beginning to feel seriously the pinch due to war-time inflation of values and costs. Traffic congestion and bad weather had added to the difficulties. But, as in 1914, the Commission was inclined to doubt whether a real emergency existed. The several months succeeding February had shown considerable improvement. Moreover, while the Commission appreciated the war-time importance of the railroads, "this record does not convince us that the . . . granting or refusing to grant increased rates will facilitate or retard the successful prosecution of the war."

The year 1916 had been so profitable that the Commission felt that some decrease in earnings would not cripple or incapacitate the roads. After studying the general trend of earnings, it predicted that net income in 1917 would exceed the average of any three consecutive preceding years. It is perhaps unfair to charge the Commission with lack of economic foresight in its failure to foresee the great rise in costs, then just beginning. But railroad officials did predict the outcome, and the Commission merely closed its eyes with the statement, "no one can know in advance."

The Commission contended that a horizontal fifteen per cent increase would in many instances (especially on long-

haul traffic) seriously affect traffic relationships. While the roads were willing to work out these adjustments as soon as the general advance should be made, the Commission feared that serious traffic disturbances would be caused, and "this record does not disclose the existence of a situation requiring so heroic a remedy." The transportation of troops would not prove a burden, but, on the other hand, might even prove profitable to the roads.

After a review of the figures the Commission concluded that "the general operating results, looked at in the large through a series of years, show on the whole substantial improvement, general prosperity, and, by comparison with former years, ample financial resources with which to conduct transportation."

The temporary trend of earnings was found to be more favorable for Western and Southern than for Eastern roads, the latter being hampered somewhat by increased wages and terminal congestion. Accordingly, the Eastern roads were granted certain increases in class rates. An increase in rail and water rates was also allowed in order to bring such rates up to the level of corresponding all-rail rates.

The dissenting opinions of Commissioners Meyer and McChord and the concurring opinion of Commissioner Harlan did not introduce any new points of particular interest, and merely indicated the rather wide divergence of views between members of the Commission.

#### WAR-TIME OPERATION OF THE RAILROADS

It seems unnecessary for the purposes of this study to describe in detail the history of Government operation of the railroads during the war. A brief outline of events is essential, however.

On January 1, 1918, the newly appointed Director-General of Railroads, Mr. W. G. McAdoo, began directing the operation of practically the entire transportation system of

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the United States. Under the Act of Congress creating a Railroad Administration, the roads were guaranteed a certain net income from railroad operations (net income after expenses, taxes, and operating rentals, but before interest, dividends, and miscellaneous charges). The "standard return" for each road was to be equal to the average yearly income obtained during the three years ended June 30, 1917, with adjustments as to current maintenance, betterments, etc.

The question of increased rates now became of minor importance to the railroads themselves, inasmuch as they received a guaranteed income. The question was merely as to whether any deficit from operations which the Government might incur should be paid out of the general treasury or met by an increase in rates. In 1918 the Director-General, without any extended investigation or hearing, authorized a twenty-five per cent increase in freight rates.

When private operation of railroads was resumed on March 1, 1920, the transition was facilitated by extending the payment of the standard return to such roads as desired it, up to September 1, 1920. All the important railroads, with the exception of three or four, gladly accepted this extension, as operating costs had advanced faster than revenues and many roads were in danger of bankruptcy if forced to rely on their operating income to meet fixed charges.

In the meantime the Esch-Cummins Act, which became effective February 28, 1920, radically changed the method of regulating rates, which were now returned to the jurisdiction of the Interstate Commerce Commission.

### THE ESCH-CUMMINS LAW

The principal change in rate regulation effected by the Esch-Cummins Act was an amendment of the Act to Regulate Commerce through insertion of Section 15a, paragraphs 2 and 3 of which read as follows:

(2) In the exercise of its power to prescribe just and reasonable rates the Commission shall initiate, modify, establish or adjust such rates so that carriers as a whole (or as a whole in each of such rate groups or territories as the Commission may from time to time designate) will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation: Provided, That the Commission shall have reasonable latitude to modify or adjust any particular rate which it may find to be unjust or unreasonable, and to prescribe different rates for different sections of the country.

(3) The Commission shall from time to time determine and make public what percentage of such aggregate property value constitutes a fair return thereon, and such percentage shall be uniform for all rate groups or territories which may be designated by the Commission. In making such determination it shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation: Provided, That during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to five and one half per centum of such aggregate value, but may, in its discretion, add thereto a sum not exceeding one half of one per centum of such aggregate value to make provision in whole or in part for improvements, betterments or equipment, which, according to the accounting system prescribed by the Commission, are chargeable to capital account.

Further detailed provisions were made with respect to the limitation of profits. Any earnings which the individual road might obtain above the six per cent immediately allowed, should be divided into two parts, one half being turned over to the Interstate Commerce Commission, and the other placed in a special reserve fund of the road itself. The amounts thus obtained by the Commission would be used as a general contingent fund "in furtherance of the public interest in railway transportation by making loans

to the carriers," or to purchase equipment for lease to the railroads. Any individual fund held by a railroad (from its earnings in excess of six per cent) could be drawn upon by it only when its net operating income should fall below six per cent. After such a fund should reach a total of five per cent on property investment, however, the road would not be required to make any further payment into the reserve, but could use its half of the earnings over six per cent for any lawful purpose, including dividend payments.

The result of this law was to place rate-making upon a broader economic basis. The Commission's doubts as to the bases by which it could test the reasonableness of rates were settled by the comprehensive scheme of rate regulation prescribed, and the Commission was further instructed that, in determining the group percentages which in turn would govern rates, "it shall give due consideration among other things to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation."

As to "reasonable rates," the Commission might change any individual rate on investigation, but the question of such reasonableness (which had so long perplexed the minds of conservative Commissioners) should no longer be allowed to interfere with adjustments of the general level of rates.

Recent statements attributed to newly elected Congressmen and others indicate widespread misinterpretation of the so-called "guarantee" clause of the 1920 Act. The Act is construed to provide an actual guarantee of railroad net income similar to that provided during the years 1918-20. This is very far from being the case, as should be amply indicated by railroad income in 1921-22, which averaged only about four per cent on the investment. The only means the Commission could employ to increase railroad income

would be to raise rates, and even this may have an opposite effect on net income during a period of business depression. On the other hand, the Commission could probably attempt to stimulate traffic by lowering the general level of rates only in coöperation with the railroads, as the law would apparently not permit it to force the issue.

### THE RATE CASE OF 1920

After the passage of the Act, the railroads of the entire country began the preparation of an application for a large increase in rates. The application was submitted in the latter part of April, 1920, and decision was handed down July 29th, being favorable to the roads in almost every respect.

In its review of the case the Commission first considered the territorial grouping to be adopted. Instead of the three old rate territories (Eastern, Southern and Western) four were decided upon, Western territory being divided into Western and Mountain-Pacific. The exhibits showing property investment and net operating income for the different roads were then compiled on the basis of these territories.

The next problem was as to whether five and one half per cent or six per cent should be allowed on the investment. In this connection the fact was emphasized that a number of roads had paid a net rate of seven and one half per cent for \$100,000,000 of recently issued notes. The need of additional equipment was also conceded. The Commission therefore decided that the roads were justified in requesting the full six per cent.

Another problem was to estimate as nearly as possible the property investment value to which the percentage return should be related. Without going into the matter in much detail, the Commission stated that from the facts available in connection with the general valuation of railroads (which had been under way for several years), a working value for each territory, as compared with the

book values, had been fixed as follows (in millions of dollars):

	BOOK VALUE	ADJUSTED VALUE
Eastern Group.....	\$9,038	\$8,800
Southern Group.....	2,184	2,000
Western Group .....	8,818	8,100
Totals.....	\$20,040	\$18,900

Another accounting difficulty related to the "constructive year" on which the income figures should be based. The year ended October 31, 1919, was decided upon.

The Commission then proceeded to compare the amount of income required to equal six per cent on investment with the amount actually earned for each territory. An adjustment was then made for the large wage increases which had been awarded by the Labor Board as of July 20th, subsequent to the date of the exhibits filed by the railroads.

The amount of the deficiency in net operating income being thus estimated, it remained only to determine the extent and method of obtaining additional revenue. In their original applications the carriers had proposed freight increases only, but, in their amended proposals following the wage award, increases were also suggested for passenger traffic. The following advances in rates were allowed by the Commission:

	PASSENGER RATES (per cent)	FREIGHT RATES (per cent)
Eastern Territory.....	20	40
Southern Territory.....	20	25
Western Territory.....	20	35
Mountain-Pacific Territory ..	20	25

Together with a fifty per cent increase in all Pullman rates, this surcharge to accrue to the railroad instead of to the Pullman Company.

While many shippers had protested against the granting of a flat percentage increase in all rates without giving consideration to differentials and rate relationships, the Com-

mission decided that in the main it would leave the question of differentials for later consideration. However, various rates on important commodities were considered briefly and a few modifications of the general order were made.

We have now reviewed the work of the Interstate Commerce Commission in some detail, with special reference to the gradual development of a consistent policy of regulating rates by territorial groups on the basis of fair return on investment.

The adoption of such a policy did not imply the full acceptance of the cost theory of rates, for to regulate individual rates on a cost basis raises widely different problems from those involved in the regulation of the whole body of rates. While the Commission has indicated in many ways that it leans somewhat toward adoption of a cost basis for individual rates, the many practical difficulties in the way of introducing a cost system have prevented any definite decision. The consent of Congress would, of course, have to be obtained, and, before any radical changes in the present structure are recommended, the Commission will probably await: (1) the further development of cost accounting technique, to which detailed reference will be made in Chapter XII; (2) the completion of the valuation of railroads; (3) the further results of the operation of the Esch-Cummins Law; and (4) the development of the scheme of railroad consolidations proposed in the Law, which would help to stabilize railroad income and finance.

The trend of Federal rate regulation in relation to the development of a fundamental policy of rate-making having been briefly sketched, the next step in this study will be a critical analysis of the various theories of rates.

## CHAPTER V

### THE THEORY OF RATE-MAKING

RAILROAD rate theory has two fields, (1) the individual rate or tariff, and (2) group rates. In the first we are concerned with the fact of discrimination as related to the character of the traffic and the interests of shippers, and in the second with the general policy and development of transportation as an industry.

In previous discussion of the *individual rate* by economists and railroad men, there has been a wide latitude of opinion as to the principal cause or motive behind discrimination. The fact that transportation is so intimately related to industrial development and the distribution of population has broadened the discussion, introducing ethical or social issues to complicate the economic problem.

The controversy with respect to *group rates*, as we noted from a study of the work of the Interstate Commerce Commission, has resolved itself (after minor questions of regulation have been threshed out) into two main problems: (1) standardization and stabilization of railroad income so as to conserve the best interests of railroads and shippers alike, and (2) equitable distribution of rail income between labor and capital. Since these problems have to do primarily with political policy on a national scale, we are not immediately concerned with them in a study of rate theory. What we really mean by the theory of group rates, then, is not the politico-administrative problem of regulating total income and outgo for the roads as a national system, but rather *the set of principles by which the individual road makes its rates*. As a practical matter, only a few local rates are fixed nowadays by the individual road acting on

its own initiative: traffic associations and commissions have assumed authority over the great body of rates. Nevertheless, the whole fabric of our rate system is largely based on rate relationships created by individual roads in an earlier day. The theoretical principles governing group rates, while not, perhaps, always exemplified in rate changes at the present time, are still of more than academic interest and are indeed essential to a study of the transportation problem as a whole.

Two generally accepted principles of rate-making are (1) that rates are fixed so as to obtain maximum net returns, and (2) that transportation is an industry of increasing returns or decreasing costs. The first of these may be regarded as explaining the *statics* of rate-making, and the second the *dynamics*; in other words, one defines the normal method of rate-fixing, and the other explains the broad general trend of rates. This may be made clearer by a detailed statement of the principles:

1. The principle of maximum net returns means that the schedule of rates will be fixed by a railroad with the object of stimulating certain traffic and possibly retarding other traffic, so as (a) to make use of its entire capacity, and (b) to obtain the largest possible aggregate net returns during any given period such as a year. (Under conditions of gradual traffic development, the period may extend over a number of years.)

2. The principle of decreasing costs<sup>1</sup> means that over a considerable period of growth operating costs and rates will decline, because of (a) economies due to the increased scale of operations, and (b) new developments in the art of transportation. The operation of the principle may be traced in

<sup>1</sup> It seems best to discard the phrase "increasing returns." In principle railroad net income would increase as costs decline, but this result is usually checked or offset by competition, regulation, or other factors, as notably the case during the period 1913-21. In a broad sense, therefore, it may be said that rates follow costs downward, so that "increasing returns" do not necessarily result from decreasing costs.

the history of the individual railroad as well as in the development of the transportation industry as a whole.

But these principles do not afford a satisfactory explanation of the individual rate — that is, they do not solve the problem of discrimination. They apply to the group rates, or more properly to the total business of the railroad, rather than to any individual rate or tariff. In order to appreciate this, it is only necessary to examine the meaning of the term "net returns." This is usually understood to mean the earnings available for dividends and surplus. Now, if the maximum net returns are to be sought from any particular traffic, all the cost of hauling that traffic must be taken into account and the rate then fixed so as to give the highest income over and above such cost. In other words, rate-making would simply follow the ordinary rule of price-making — that is, it should be fixed by the demand schedule on the one hand and the supply schedule (as determined by cost and competition) on the other.

But in the transportation industry it is difficult to determine the specific cost of carrying any particular shipment or group of shipments, or even to find the cost of conducting the whole freight service. This explains the difficulty of applying the term "maximum net returns" to anything but the total traffic. It also makes impracticable the use of the term "supply schedule," indicating why rate-making differs from normal price-making.

The difficulty of determining specific cost is explained by the following conditions, largely peculiar to railroad transportation: (1) temporary or local irregularities in traffic, with large differences in the amount of work required to accomplish the same service; (2) frequently a large flow of traffic in one direction with small back-loading, which would obviously result in a considerable difference in cost for similar goods moving in opposite directions; and (3) general lack of adjustment between the railroad's capacity

for service and the entire amount of traffic obtainable, which condition may sometimes last for a considerable period of time. The first two factors need not be analyzed at length. Temporary and local aberrations in cost are characteristic of most industries, though probably not to the same extent as in transportation. As to the question of heavy one-way traffic and of back-loading costs and rates, this is really a special phase of the third condition named above, and need not be separately analyzed.

Maladjustment between total capacity and total traffic may mean either excess capacity, or too much traffic. When traffic is too great to be efficiently handled, expansion usually takes place until the balance is restored. But when capacity is too large for the available traffic we have a special condition which has a considerable bearing upon the question of railroad rates as related to cost of service. To understand this it is necessary to analyze railroad costs.

The railroad is to a large extent (but not wholly) a fixed enterprise. The investment, once having been made, cannot be withdrawn nor turned to any other purpose but transportation. The interest, taxes, and rents paid to protect the investment, the maintenance expenditures required to keep the road in serviceable condition, and the general costs of administration, make up what is usually termed the "joint cost" of transportation, since such cost is joint or common and cannot be easily allocated to any particular service or portion of the traffic. The remainder of the total cost is generally called "direct cost" — that is, it is directly connected with some particular part of the traffic. There is no clear-cut line between the two kinds of cost. A special analysis of joint cost will be made in a later chapter, and here it seems sufficient to state that the ratio of joint to total cost in transportation is far higher than in most other industries, being usually estimated at about one half.

It is obvious that, *if we assume a condition of excess capac-*

ity with heavy overhead charges, the joint cost will remain practically fixed while the traffic is increasing, up to the point where traffic equals capacity. The direct cost will, of course, increase as the traffic increases, though perhaps at a diminishing rate.

Suppose that one ton of goods can be hauled a hundred miles for one dollar total cost. The common unit of work or service is the ton-mile, and the cost per ton-mile in this case would be one cent. But suppose the road has facilities to carry twice as much traffic without increasing the joint cost, and takes steps to acquire the additional traffic. If joint cost was originally one half the total cost, we have these results:

	WORK DONE (ton-miles)	JOINT COST	DIRECT COST	TOTAL COST	COST PER TON- MILE
Original traffic	100	\$.50	\$.50	\$1.00	1¢
New traffic	100	—	.50	.50	½¢
Total traffic	200	\$.50	\$1.00	\$1.50	¾¢

Now the important question arises: Are we justified in regarding the new traffic as distinct from the old, from a cost standpoint? Or should they be merged and averaged so that joint cost applies equally to both? In the former case, the original traffic would cost one cent per ton-mile and the new only one-half cent; in the latter, each would cost three-fourths cent.

Here we have one of the basic problems, both of rate practice and of theory. From the practical point of view, the railroad executive will desire to obtain the *maximum net returns* from both the original business and the new business. In order to do so he will probably charge a low rate on the new traffic and recoup himself on the old traffic — but is he morally justified in so doing? Could he do so if

he did not possess *any* monopoly control of the old traffic? And does this phenomenon explain satisfactorily all cases of discrimination (as is assumed in the "joint cost" theory of rates)?

To summarize, the principle of maximum net returns cannot be accurately applied to the individual rate because "net returns" implies net return above cost; and it is difficult to determine the cost of service corresponding to any given rate because (1) there are always many irregularities in service and operation; (2) joint cost, which constitutes at least half of total cost, can only be apportioned arbitrarily; and (3) in cases where there is unused capacity and new low-grade traffic can be acquired without adding to the total joint cost, the question arises as to how much, if any, of the joint cost the new traffic should be made to bear — that is, how much discrimination in rates in favor of the new traffic is warranted.

It is evident that the individual rate is not fixed by the ordinary rules of price-making, in which cost is a large factor. The lack of a cost basis affords *opportunity* for making discriminations in rates, but this does not necessarily serve to *explain* discriminations. Various theories which attempt to explain the governing factors in discrimination may be classified as follows:

A. Those which emphasize the nature of the *demand for transportation* apart from the physical nature of the work done (that is, the characteristics of goods which make them more valuable after shipment than before).

1. The theory that "value of service" justifies discrimination.
2. The theory, widely advocated by railroad men, of "charging what the traffic will bear."
3. Professor Cooley's theory that rate inequalities are necessary to encourage the greatest freedom in movement of goods.

4. Dr. Cohn's theory that rates may be compared to taxes with regard to "ability to pay" as a basis.
- B. Theories which emphasize the conditions of the *supply of transportation* (that is, the characteristics of transportation as an industry, or the nature of the particular service performed):
  5. Professor Taussig's joint-cost theory, which involves the assumption that the condition of excess capacity referred to above is typical of all transportation.
  6. Professor Pigou's theory that monopoly is the principal reason for discrimination.

The theory of individual rates has not received the amount of attention which it deserves. Owing, perhaps, to the comparatively recent development of railroad transportation and the consequent late appearance of rate-making as a form of valuation, the issue as between value of service and cost of service has not yet been clarified. Accordingly, it will be worth while to give detailed study to all the above theories in order to arrive at some conclusion as to the efficiency of the present rate system and as to the modifications which should be made in it.

## CHAPTER VI

### THE "VALUE-OF-SERVICE" THEORIES OF DISCRIMINATION

THE "value-of-service" theory has seemed to many authorities to afford a plausible and adequate explanation and justification of rate discriminations. The International Railroad Congress of 1905 adopted a platform containing the statement that "tariffs should be based on commercial principles, taking into account the special conditions which bear upon the commercial value of the service rendered."<sup>1</sup> A similar statement made by the Interstate Commerce Commission in 1887 has already been quoted (Chapter II).

The value-of-service theory justifies the practice of discrimination on the ground that the transportation service performed for one commodity may be valued much more than the same kind of service for another. The only practical test of such values is the relative prices of the two commodities: for, as Professor Taussig has pointed out, to identify the commercial value with the social or strictly utilitarian importance of the service might mean higher rates for wheat than for silks and diamonds.

The demand for transportation is measured by the price differential for the goods at destination over that at the point of shipment. But can it fairly be contended that the railroad *creates* the excess of value which a commodity may have at point B as compared with point A? In a sense the railroad creates *place* utilities in the same way that the manufacturer produces *form* utilities and the merchant *time* utilities. But the value of a commodity in the hands of the consumer is usually compounded of all three forms of utility. Two of the joint producing agents, the manufac-

<sup>1</sup> The Bulletin of the International Railway Congress (1905), p. 1972.

turer and the merchant, let us assume, set a reasonable value upon their services; but the third agent, the railroad, may take advantage of this situation and charge a high price for its contribution to the joint utility, particularly if it enjoys a local monopoly of the traffic. In doing this it may be diverting to itself a part of the commodity value "created" by the manufacturer and merchant in addition to that part which it has itself "created." The railroad, in charging a high rate, may tend to dam up goods at point A, allowing but a small amount to reach B; therefore, unless goods can be produced at B, the railroad may in effect obtain a monopoly as regards both form and place utilities, and to a less degree as to time utility. To maintain that it has "created" the full excess value thus obtained is certainly fallacious.

Let us assume for the sake of argument, however, that the railroad does not exercise any monopoly and that it *does* create the entire excess value at the point of destination. How is such value to be determined as a means of testing rates? With competitive merchandising at both A and B the article can be worth at B only so much more than at A as it costs the dealer to transport it. In other words, the freight rate itself determines the greater value at B; the latter indicates the value of the service, which in turn justifies the rate. This *reductio ad absurdum* has been well summarized by Professor Taussig<sup>1</sup> as follows:

If rates depend on the value of service in the sense of value in exchange, we are confronted with the obvious difficulty that the rates *are* the value in exchange of the service. The explanation then says that charges are determined by what is charged; which does not much advance matters.

Transportation is a quasi-public service, the benefits of which should be obtainable by all in equal measure, as indi-

<sup>1</sup> "The Theory of Railway Rates." *Quarterly Journal of Economics* (1891), vol. 5, p. 463.

cated by the term "common carrier." The right of eminent domain is granted to the railroad on the assumption that, like the old toll-roads, it is a public highway equally accessible to all. To vary the charge to different classes of travelers on a toll-road would be as just as to vary the freight rates for the same service in transporting different commodities. To charge a shipper in proportion to his need for transportation, or to fix a rate on a commodity in proportion to the demand for it at the point of destination, is to make the railroad the master rather than the servant of commerce. Discrimination against the individual shipper — rebating — is universally condemned: but indirect discrimination against groups of shippers is excused on the theory of relative service values. Yet in principle there is no real distinction between the two practices, except that the rebate is necessarily secret and unstable.

#### **"CHARGING WHAT THE TRAFFIC WILL BEAR"**

The theory of "charging what the traffic will bear" resulted from an attempt by railroad interests to describe a well-known traffic practice. Just what is meant by saying that some goods will "bear" only a low rate, while others will bear a high rate? Rates may be high for high-value goods (especially luxuries) without interfering greatly with the sale of the goods simply because the rate is a small part of the price. On the other hand, the low-value goods are mainly raw materials transported a long distance; and the cost of transportation may be greater than the original production cost (as frequently with coal). Moreover, these materials usually can be supplied from different parts of the country, or can be stored indefinitely, or the factories which receive them can change their location. Hence these goods will bear only a low rate at least so far as the individual road is concerned. And if all the roads together were to agree to raise rates simultaneously on low-value commodities, the demand for transportation would undoubtedly de-

crease over a long enough period of time to permit industries to locate closer to the source of raw materials.

In effect, "charging what the traffic will bear" simply expresses the contention that no railroad will seriously stifle or prevent the movement of low-grade traffic by charging excessive rates. It has been more correctly stated as "*not* charging what the traffic will *not* bear." But who should judge as to whether such traffic is stifled or not? The question as to what constitutes a normal amount of traffic in any commodity, or the extent to which that traffic should be developed to serve the best interests of the public, will not *necessarily* receive a happy solution at the hands of the traffic manager — as is indicated by the numerous complaints of shippers.

The phrase "charging what the traffic will bear" has frequently been interpreted by anti-railroad interests as "charging *all* that the traffic will bear." While the railroads have in mind the low-value traffic, their opponents point to the high rates on high-value traffic. And the latter naturally suggests a fact or condition which has always been particularly obnoxious to the American public — monopoly power and its abuse.

The railroads themselves realize the sinister significance which the phrase "charging what the traffic will bear" has come to acquire. In the Western Freight Rate Case of 1910 President Edward P. Ripley of the Santa Fé, as spokesman for the roads, tried to give it a constructive meaning. He stated that it meant fixing rates in such a manner as to create the greatest amount of traffic of all kinds, building up commerce and benefiting industry as well as the railroads. But the Commission held that this involved putting almost unlimited powers in the hands of the traffic official, who might virtually regulate the various industries dependent upon his railroad and thus indirectly determine the prices of the manufactured commodities. Indeed, if rates should be based upon the ability to pay, traffic men might

logically ask for access to shippers' account books in order to discover what profits they were making.

### THE "GREATEST-FREEDOM-OF-INTERCHANGE" THEORY

In the discussion of rate theory in the Western Rate Case, referred to above, the railroads contended that rates fixed on a value-of-service basis would encourage "the greatest possible freedom of interchange." In the opinion of the Commission this phrase was misleading, since no rate would be lowered beyond a point where net revenue would decline, even though greater traffic might result. Mr. Ripley then declared that rates should be made without regard to costs or return on capital, but the Commission concluded that this could refer only to the individual shipment and not to the entire traffic handled under a given schedule of tariffs.

The "greatest-freedom" theory, though differing little from "charging what the traffic will bear," deserves a careful independent analysis. It carries the implication that rates should be so fixed as to encourage the centralization of industry. An interesting exposition of the theory has been made by Professor Charles H. Cooley:

The leading idea of the greatest-freedom principle is that transportation, in so far as it can, should set economic forces absolutely free, and that rates should be adjusted with this aim. . . . In so far as freedom from physical restrictions is attained society is enabled, by the maximum of specialization, to get the greatest possible result from the division of labor. Under the normal operation of economic laws, freed from the trammels of distance and from the unjust discriminations now prevailing, cities will locate themselves at such points as offer special facilities for manufacturing production, and grow to such size as is advantageous, and no larger. If they become very large it will be because that is necessary and expedient. . . .

The classification of freight should be based as nearly as practicable, upon value. . . . Charging for value rather than bulk or weight, these mechanical and, so to speak, accidental elements, are in so far eliminated from among economic forces. Economic

forces are freed in the degree that those that are social in character are enabled to supersede those that are merely physical. And value is the social measure of commodities as opposed to the purely material measures, bulk and weight. . . .

In distributing cost of movement according to value we are distributing it according to the ability to bear it.<sup>1</sup>

It is interesting to compare the statement that, under the value basis, "If cities become very large it will be because that is necessary and expedient," with a previous statement made by Professor Cooley that, "as to the distribution of manufacturing and commercial industries, they [rates] should favor decentralization rather than concentration." Apparently realizing this serious inconsistency, Professor Cooley admitted that the "unconditional application" of the greatest-freedom principle would be inexpedient with respect to distance rates, but as no real attempt was made to clear up the difficulty the theory loses much of its significance.

Further implications of the theory were stated by Professor Cooley as follows:

The theoretical effect of basing rates upon value is that the movement of useful things is promoted in the highest possible degree, and that the cost of transportation enters as a uniform percentage into the cost of all commodities. Movement is promoted because its cost is distributed equally and not made to fall harder upon heavy things than upon light. It may be assumed, in general, that the value of a thing and not its weight is the measure of its ability to pay for transportation; and that in distributing cost of movement according to value we are distributing it according to the ability to bear it. The statement that such a distribution would also make the cost of transportation enter everywhere as a uniform percentage of the cost of the commodities is sufficiently accurate for the present purpose, though perhaps inexact. It is clear that if it cost everywhere five cents to move a dollar's worth of goods to market, that five cents will, in general, raise the total cost at the point of delivery to one dollar and five cents.<sup>2</sup>

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<sup>1</sup> *The Theory of Transportation* (1894), pp. 115-16.

<sup>2</sup> *Ibid.*, pp. 116-17.

There are several fallacies in the above statement. In the first place, there is no particular reason why transportation cost should be a certain percentage of market price.<sup>1</sup> It is difficult to see how distance tariffs could be used under such a system — the rate would have to be a flat percentage of value regardless of distance hauled. Again, a difficulty arises from the fact that some commodities are transported many times (in various stages of production and marketing) before reaching the consumer: so that, if transportation cost were a flat percentage of value in each instance, the final value would include the sum of all these freight charges, which would be far in excess of the given percentage. Moreover, under this system the much-transported article would be heavily taxed, for each successive transportation charge would be based on a value which included all previous freight charges.

Professor Cooley attributes to consumers' value a significance which it does not have. While the value of a commodity may be used as an index to ascertain important conditions, yet value does not possess any mysterious quality separating it from the facts and conditions of supply; and among these facts and conditions are transportation and rates. Doubtless he would admit that value means little when segregated from the manifold processes involved in production and consumption. Under the modern complicated industrial scheme, the amount of transportation may be diminished or increased freely as warranted by the economics of the productive process. It cannot, therefore, be considered (as he seems to regard it) as a *sine qua non* of production and supply.

Professor Cooley explains his view of rates and prices by referring to weight and bulk, the main factors in transporta-

<sup>1</sup> The value of the commodity is a factor in the cost of transportation, however. While bulk and weight are the most important determinants of cost, certain expenses, such as loading costs, loss and damage claims, etc., are largely in proportion to value. But this does not warrant the use of value as the sole determinant of the rate.

tion, as incidental elements. Yet bulk and weight are among the most important facts with which all productive processes are concerned. To dismiss them as "incidental" is to take an arbitrary view of production, which from beginning to end is concerned with shaping to man's use the resisting qualities of matter.

Granted, then, that place utilities differ in no essential way from form utilities and time utilities as factors in supply and in value, it is obvious that transportation does not differ in any fundamental way from other kinds of production. If rates in transportation were fixed on the basis of value of goods, the same rule might be suggested for other industries which have a large part in the production of goods. If each industry should be required to base its rate or price upon the rates or prices of the others — what would be the result but chaos?

#### THE TAXATION THEORY

In further defense of the practice of discrimination, it is often contended that luxuries may fairly "bear" a higher rate than necessities. This is the taxation theory elaborated by Dr. Cohn and others. The theory assumes that social welfare will be promoted if luxuries are transported at high rates so that necessities may be carried at low rates. Obviously this means levying a tax on the consumption of luxuries. But is it safe to permit the railroad to possess powers equal to the taxing power, which is a jealously guarded prerogative of governments? The same danger of abuse exists with respect to such taxation as with regard to the potential control of industry by the railroad.

Moreover, can the line between luxuries and necessities be clearly drawn? Is it not possible that some necessities will be taxed because they resemble luxuries in having small bulk and high value? Goods of high value in proportion to bulk or weight would naturally tend to bear a high rate, because a considerable increase in the rate would mean but a slight

percentage change in the price paid by the consumer, and hence the reduction of demand would be much less than if the rate constituted an important part of consumers' price. In the case of luxuries this tendency might be increased, as dealers would probably find it easier to raise the price; nevertheless the tax power would in general apply to all high-price goods, and would not be a clear tax on luxuries or upon the wealthy classes. Discrimination may be based, like taxation, on the ability to pay: but with the difference that in the former case "ability" has no ethical social significance, while in the latter it may have. In other words, while the "ability to pay" of an individual at once suggests the ethical desirability of leveling the inequalities of income, "ability to pay" in a commodity carries no such ethical implication, except in cases where it clearly reflects ability to pay in a group or class of individuals. As such cases form only part of the whole number, the ethical consideration is of little weight.

We find, therefore, that, while the taxation theory is an interesting variation of the idea of "charging what the traffic will bear," it presents little new evidence for the *defense* of that practice. Also it is rather more limited in application than the original theory, for it is difficult to see just how it would logically apply to discrimination in distance tariffs. For from the standpoint of taxation alone, the "ability to pay" would seem to be greater in the large centers of population, whereas the rates to such centers are frequently lower than to the small adjacent communities.

### CONCLUSION

None of the value-of-service theories have proved entirely satisfactory as an explanation of discrimination, and none of them provide a real defense of the practice, at least on a *pri-ori* grounds.

The concept of "value of service" in itself affords no safe test of rates, in the same way that "intrinsic value" affords

no standard of fair price: for in neither case is there a picture of the workings of demand and supply.

Again, the theory of "greatest freedom" — that is, that commerce should be built up through low rates — seems an excellent one until the question is propounded, "Who will pay the cost of making the low rates, and why?" Moreover, "greatest freedom" means in effect centralization of industry, which at the present time has proceeded too far for the general good of society.

The theory of taxation according to the ability to pay seems at first to open a hopeful line of analysis — until it is realized that taxation on commodity rates cannot be expressed in terms of a tax on individuals, because there is no direct relationship between the two; while the theory is found not to apply at all in the case of distance tariffs.

Professor J. M. Clark, in his comparison of the European and American rate systems, has well described the negative character of the value theories:

As to the theoretical basis of their systems, both schools [European and American] are agreed in a general way. Both go on the principle of covering fixed costs by fixing rates according to the "value of the service" or "what the traffic will bear." But this theoretical agreement does not prevent wide practical differences, and the reason lies simply in the fact that the value principle in its bare form is not a positive but a negative one. As we shall see later, it offers no external standard for judging rates or adjusting them. Of course, rates are phases of value, for they are themselves the money value of particular services. But the economic laws of value take on very different aspect according as a business is public or private in character, or as it is monopolistic, competitive or of mixed nature. So it is clear that an argument that goes no further than this is meaningless. All that the "value" principle necessarily means is the policy of breaking away from mileage or "natural" or cost systems in the direction of greater freedom.<sup>1</sup>

There is evidently little justification in economic theory for the value-of-service theory of railroad rates. Why, then,

<sup>1</sup> *Standards of Reasonableness in Local Freight Discriminations* (1910), pp. 13-14.

have economists shown such persistence in defending and elaborating the doctrine? The real explanation seems to lie in the fact that the present rate system has so many characteristic features of the value of service theory; and that (superficially at any rate) the system appears successful. A system which "works" must have pragmatic theories to explain it.

The fact that the theory is wrong does not necessarily mean that a system for which it provides no justification should be changed arbitrarily or quickly. Industry is not a fixed institution, but is more like an organic growth, accommodating itself automatically to the irregularities of economic contour. To change the rate system suddenly would destroy large vested interests and greatly disturb the functioning of our industrial machinery. In this fact lies the principal defense of "value of service" in our present rate system.

## CHAPTER VII

### THE JOINT-COST THEORY

THE value-of-service theory, as noted at the beginning of this study, stands opposed to the cost-of-service theory. Some economists have tried to reconcile the two theories through an analysis of transportation costs and rates as related to the traffic in different classes of commodities. This has resulted in the development of the "joint-cost theory of rates," first elaborated by Professor Taussig in a series of articles in the *Quarterly Journal of Economics* in 1891, and defended by him a few years ago in a lengthy debate with Professor Pigou of Oxford, which also appeared in the *Quarterly*.

Professor Taussig appears to have given a clearer exposition of the joint-cost theory of rates than any other authority:

Looking at the matter broadly, we have here [in transportation] commodities produced, in part at least, at joint cost. For the explanation of the value of commodities produced under such conditions, the classic economists developed a theory which they applied to cases like wool and mutton, gas and coke, where practically the whole of the cost was incurred jointly for several commodities. But obviously it also applies, *pro tanto*, to cases where only part of the cost is joint. The conditions for its application exist in any industry in which there is a large plant, turning out, not one homogeneous commodity, but several commodities, subject to demand from several different quarters with different degrees of intensity. Under such circumstances, while part of the cost is incurred separately for the individual commodities, a part is incurred jointly for all of them. The nature of the demand, then, has a permanent effect on their values. Traffic which will continue to come even at comparatively high rates will continue to be taxed high and will contribute largely towards fixed charges. Traffic for which the demand is sensitive to price, and which can be got only at low rates, will contribute little. . . .

The greater part of railway expenses is entirely independent of the traffic; it must be incurred in order to do any business at all. Of the remaining smaller part of the expenses, a large proportion consists of items which vary with the volume of the traffic as a whole. The rest contains items which, while confined to certain great groups, are yet incurred jointly for the traffic within each group. Meanwhile, the services or commodities produced are not homogeneous. Railways present on an enormous scale a case of the production at joint cost of different commodities.

The application of this conclusion is obvious. As with all commodities at joint cost, demand has a permanent effect on values or prices (for the purposes of this investigation the terms may be used indiscriminately). . . . Coal, lumber, ores, will be offered for transportation only if rates are so low that if they were applied to the whole traffic the enterprise would not pay. Nevertheless, if these articles yield anything over the separate expenses incurred for them alone, the road will take them, because the other expenses are incurred for the traffic as a whole, and will not cease if the heavy traffic is given up. Other goods, of greater value in proportion to bulk and weight, will be offered for transportation in much the same quantities, whether the rate be as low as on coal and ores, or a good deal higher. . . .<sup>1</sup>

Professor Taussig names several other instances of value which have been enigmatical, but which he believes to follow the joint-cost principle in the same manner as the more classic examples:

The prices charged to the play-goers for opera chairs, seats in the pit, and gallery standing room have been discussed, as if they were quite anomalous, and inexplicable on the general theory of the bearing of cost on value. Similarly, the relative prices of first-floor and fifth-floor apartments have proved puzzling. Obviously, the element of joint cost is largely present in these cases, and the principle helps to clear up such real difficulties and anomalies as they present.

Professor Taussig's argument, somewhat amplified and rearranged, may be stated as follows:

<sup>1</sup> "The Theory of Railway Rates." *Quarterly Journal of Economics* (1918), pp. 443-44 and pp. 453-54.

1. *The argument based on static conditions:* Goods produced jointly may be classified as homogeneous or non-homogeneous. When homogeneous, differences in price are due to the exercise of monopoly power with respect to certain parts of the supply.<sup>1</sup> But when various non-homogeneous goods are sold by one producer simultaneously, different demand schedules will naturally exist and prices will be fixed on the basis of the demand. While the price schedule as a whole will be regulated by the desire to obtain total revenues in excess of the total joint cost of production, the price of any particular commodity may equal a large or small part of such cost. Where the cost of production is not all joint cost, the price of each commodity will at least equal the direct (non-joint) cost of producing it. Railroad transportation is an example of non-homogeneous joint production with costs partly joint and partly direct: therefore railroad rates on particular commodities will be fixed — (a) so as to cover at least the direct cost; (b) above that, in accordance with the intensity of the demand, and without respect to an equal or *pro-rata* distribution of joint cost; but (c) some rates must be high enough so that the total net revenue from all traffic (after deducting the direct costs) will more than meet the joint cost.

2. *The argument based on dynamic conditions:* Upon studying the life-history of the typical railroad (based on the early era of steam transportation in this country), it appears that a considerable part, though not all, of the joint cost remained fixed as the total traffic gradually increased. Hence rate-making policy developed as follows: (a) In the very beginning rates were comparatively high, so that only

<sup>1</sup> It is questionable whether the fact of monopoly affords a complete and satisfactory explanation of the selling of the same article, such as soap or candy, differently wrapped and priced, to different buyers. The psychology of the buyer, based on his general purchasing power or the failure to investigate the quality of the goods offered, enters into the matter; but, in the sense that competing sellers agree or connive at the practice, monopoly is undoubtedly a factor.

traffic which could afford to pay such rates (that is, high-value goods) were carried; (b) however, the railroad possessed unused capacity, and in order to obtain a larger business rates were reduced for low-grade traffic (that is, goods of low value in proportion to bulk or weight, such as coal, lumber, etc.); (c) since a large part of joint cost remained fixed, and since the original high-value traffic paid for the greater part of this cost, the new rates were not necessarily unprofitable, particularly as a large volume of traffic could be developed with resulting economies in the direct cost of handling; (d) this process was repeated as the road continued to grow, so that there was a constant tendency to fix lower rates on the low-value commodities than on the high-value.

Thus the same conclusions are reached by the two different methods of analysis.

Professor Taussig's arguments rest on two assumptions: (1) with respect to statics, joint production necessarily implies the existence of a joint cost which cannot be allocated to the different goods produced; and (2) that with regard to dynamics joint cost is to a considerable extent fixed cost — that is, it does not change in proportion to an increase or decrease in total traffic handled. It is important that we examine these assumptions in detail, for if they are unwarranted the entire reasoning based on them fails.

In considering Professor Taussig's first argument it is necessary to keep distinct the three concepts — joint production, fixed-ratio production, and joint cost. Where joint production is also fixed-ratio production, there is no question but that prices will be fixed according to the demand schedules — that is, the relative scarcity of the respective commodities, or the relative degree of monopoly enjoyed by the producer. The products for which the lowest prices are obtained (as well as those of no value whatever) will be considered as by-products of the higher-priced goods. Where the by-product is of the same character, but of

poorer quality than the main product (as rump and sirloin, or first-floor and fifth-floor apartments), the possibility of *substitution* is an important factor in marginal utility, demand and value; where the by-product is of different character (as mutton and wool), the factor of substitution would not enter. In either case, however, the same rule would apply with respect to joint cost: the scale of prices for all the goods jointly produced would take total joint cost into account, but the price of the individual commodity would not necessarily bear a *pro-rata* share of the joint cost.

But when different goods are produced jointly with the possibility of varying the respective amounts, such variation (whether accidental, experimental, or due to changed demand) should eventually have an effect on total joint cost. Over a period of time this change in joint cost will probably be noted, and traced to the variation in the production ratio.

This distinction between the two kinds of joint production — fixed-ratio and changeable-ratio — must be analyzed carefully in order to gain clear ideas of railroad economics. It is necessary to determine to what extent the transportation of different commodities on a railroad is comparable to the joint production of mutton and wool, or the building of five-story apartment houses, or the burning of coal to produce gas and coke.

To begin with, it is evident that there are relatively few cases where two or more commodities are produced together in exactly fixed proportions, without any possible control of the ratio between the two. The gas and coke example is perhaps the best, but even here the ratio may be changed by selecting a different kind of coal. In the case of wool and mutton, it would be evident to a farmer that there is a considerable degree of choice as between the production of the two — one is not a *necessary* by-product of the other. Professor J. M. Clark suggests rump and sirloin as a substitute example for mutton and wool: this is an improvement,

though even here breeding conditions might effect some change in the ratio of supply of the two commodities over a period of time. In considering the case of orchestra and gallery seats in a theater, we should take into account the relative numbers of such seats in competing theaters. Similarly, the rents for fifth-floor as compared with first-floor apartments might be affected by the relative numbers of five-story apartment houses as against those with less than five floors.

Conditions of joint production are prevalent in almost every industry, but it is important to distinguish between cases where one product is a fixed by-product of another and instances where there is a measure of control between the respective amounts produced. The mining industry presents the best examples of real by-products, with the choice as to production (though perhaps not refining) fairly limited. For some agricultural products, such as different grades of beef, it is evident that the measure of control is very slight; in other instances, as wool and mutton, there is a larger possibility of choice; while in the diversification of crops which a farmer can grow on a given piece of land there is a considerable, but not unlimited, degree of choice. In manufacturing still greater freedom usually exists, because we are fabricating goods from raw materials, rather than wresting the raw materials or foods from Nature's grip. But almost every manufacturing industry presents instances of limited control exercised by the entrepreneur as to changes in the proportions of the different commodities which he produces.

Transportation does not differ from other industries in presenting instances of by-product production. An example would be a small spur or "feeder" extending from the main line to serve only a particular industrial plant: obviously the feeder is adapted only to that particular traffic, and cannot vary its production except as new industries or communities are built up along its line. Or a road may have been

built as an extension into poor territory which has failed to develop, and the road is forced to take all the local traffic offered without choice. In these instances the "feeder" traffic is in a sense a non-controllable by-product of the main line. But instances of such roads are relatively few, and it would be unfair to draw conclusions as to the condition of transportation as a whole from the study of a small "feeder" line, or a bankrupt railroad. A road of typical size (for example, one thousand miles of main line) has a considerable variety of traffic, serves a great number of localities and industries, and can exercise a considerable degree of "choice" as to traffic. It must take all the traffic immediately offered to it,<sup>1</sup> of course, but a considerable amount of control over future traffic can be exercised by changing rates and service (assuming, of course, that it is left free to exercise such control).

Even a road with a preponderance of one kind of traffic, such as a coal carrier, would not find any insuperable difficulties in the way of changing its traffic, should this prove advantageous. That part of the plant most adapted to the particular traffic hauled, the equipment, is composed of small units which are freely interchangeable among all the railroads of the country under standard rental agreements. Thus the freight-car facilities of any one road may be quickly adapted to changes in its traffic. Of course, any sudden and radical change in the train-loading, speed, or routing of trains might require changes in roadway and structures, as well as in the equipment, but the fact remains that the average railroad can exercise considerable choice as regards change in production. We can hardly agree with Professor Taussig, therefore, when he likens railroad transportation to the production of gas and coke or mutton and wool, where the possibility of varying the proportion of products is far more limited.

<sup>1</sup> In some cases traffic embargoes have been declared, but these were due to temporary emergency or glut of traffic.

In transportation one class of goods will cost less to haul, under average conditions, than another class, and this will be reflected in variations in total cost. The observation of changes in total cost from year to year, due to changes in the make-up of the traffic and the conditions of operation, will lead to definite, though necessarily approximate, ideas as to the distribution of joint cost among different kinds of traffic. Sooner or later, such considerations will be taken into general account in rate-making. Thus the extent to which the commodity can be loaded solidly in cars or trains is an important cost factor; another is its length of haul as compared with other commodities. As these factors change, the rate charged is likely to change.<sup>1</sup> Nevertheless, such distribution of joint cost is so inaccurate and unscientific that it has probably only offset in part the tendency to fix rates on the basis of commodity values or other factors which result in discrimination.

Professor Taussig's first point, that the prices of various goods produced jointly are fixed without any regard to equal distribution of joint cost, was meant to apply to cases in which the railroad is already handling both high-grade and low-grade traffic (or has been handling them since the beginning of operations). His second point, namely, that traffic can be considerably increased without affecting the amount of joint cost, is doubtless intended to cover the case where a large amount of new or additional traffic is secured by fixing rates which take no account of joint cost. "The greater part of railway expenses is entirely independent of the traffic," therefore the traffic can be increased indefinitely without adding to such joint cost. But does not this imply that the railroad possesses a surplus of unused capacity? For, if it is already carrying all the traffic for which it has capacity, taking any additional business would mean that some part of the facilities must be improved or added to,

<sup>1</sup> An investigation of the average rates for various lengths of haul, train-loads, etc., which appears in Chapter X, supports this statement.

and more administrative work must be done, thus causing an increase in interest charges, maintenance costs, and officers' salaries. Therefore from Professor Taussig's view the average or the typical railroad must possess unused capacity: indeed, such a condition must by him be considered inherent or normal in transportation as an industry. This error in analyzing the character of transportation apparently springs from several sources:

1. The idea of *capacity* is not clearly defined as *efficient capacity*. A railroad can always, if required, perform service beyond its normal capacity, but this results in poorer service, added wear and tear on facilities, and an increase in the direct cost of transportation. Conditions in our transportation system during and following the European war are typical of such a condition.
2. The early history of the average railroad presents instances of the condition which Professor Taussig assumes to be normal and continuous. He describes the historical development of the freight classification as follows:

All the early railroad tariffs were simple, and made little discrimination between different sorts of commodities. As time went on, experience forced on managers, whether in charge of public or of private railways, that adaptation of rates to demand which is the inevitable outcome of the peculiarities of the industry. In the early days of the Pennsylvania Railway, it was doubted whether the road could undertake to carry coal. It was argued that any freight which did not yield two cents per ton per mile must be carried at a loss. But a clear-headed officer pointed out that many general and constant expenses must be incurred, whether or not the coal was carried, and that the items which alone would be affected by the new coal business were comparatively small. The experiment was tried of carrying coal at what then seemed very low rates, and the traffic soon assumed large proportions.<sup>1</sup>

During the seventies and eighties railroad mileage grew by leaps and bounds, encouraged by the vast amount of

<sup>1</sup> "The Theory of Railway Rates." *Quarterly Journal of Economics* (1891), vol. 5, pp. 455-56.

new territory opened up in the West, large grants of land and money by the Federal, State, and local Governments, and excessive speculation in railroad securities. But during the past few years scarcely any new mileage has been constructed; in fact, much mileage has been abandoned. So far as main line mileage is concerned, the capacity for traffic expansion is far less to-day than in 1870. The condition of *excess capacity* is therefore no longer normal.

3. The meaning of the principle of increasing returns was not clearly analyzed. The great increase in traffic during the past fifty years having been accompanied by a considerable reduction in costs and rates, this decline is regarded as largely, if not wholly, due to the "fixed-cost" principle, whereas it is mainly due to the operation of the principle of increasing returns, which applies to direct as well as joint cost.

4. The assumption as to fixed cost may also be due in part to the fact that many railroad reports to stockholders still retain the term "fixed charges," although the official accounting regulations have not recognized the term since 1907. "Fixed charges" in the railroad income account usually includes all the rental debit accounts, the interest on funded and unfunded debt, and several minor items. The total of these accounts does not remain "fixed" in the sense of being unchanged, as a study of railroad reports will quickly reveal. The rental account for hire of equipment will vary widely from year to year. Total interest payments are seldom constant for more than two or three years in succession. "Rentals for lease of road" is perhaps the only item which can fairly lay claim to the adjective "fixed."

It is true that taxes, interest charges, and rentals of leased lines are fixed in the sense that they must ordinarily be met whether traffic increases or decreases. But if traffic declines and the road's earnings prove inadequate, it will go into receivership, and the "fixed charges" will be considerably reduced in reorganization: hence, in the long-time sense even

interest is not fixed. Moreover, the capital structure of the railroad should be considered as a whole, and dividends included with interest as part of the general costs of operation: especially since in the cases of a number of roads dividends have taken the place of interest payments on bonds wiped out in reorganization.<sup>1</sup> Granted this statement, it is evident that when a road's traffic falls off it can cut its total costs by reducing dividend payments.

Moreover, the term "fixed cost" in railroad economics is generally understood to include not merely the so-called "fixed charges," but also the taxes and a large proportion — one half or more — of the operating expenses. Thus, Professor Seligman takes the view that maintenance of way and structures expenses and general expenses "will change only slightly with the traffic," and "it may be safely affirmed that in general about one half of the operating expenses (together with fixed charges) are constant or invariable."<sup>2</sup>

Professor Taussig quotes the statement of President Delano of the Wabash Railroad (1911), that "about fifty-five per cent of the expenses of operation go on uniformly regardless of the volume of business done." He does not, however, include Mr. Delano's statement, later in the article, "that *until a road's facilities are taxed to their capacity*, every increment of business is of immense advantage."<sup>3</sup> It is evident that Mr. Delano had in mind the earlier life-history of the average railroad, rather than the conditions typical of present-day railroading.

The United States Industrial Commission, in its report to Congress, 1902, quoted Mr. Acworth's studies of English railroad operations, from which the conclusion was obtained that from two-thirds to three-fourths of railroad costs go on independently of the amount of freight or passengers moved.<sup>4</sup> In support of this a table was also presented, showing

<sup>1</sup> For example, Atchison, Union Pacific, Great Northern.

<sup>2</sup> *Principles of Economics*, p. 369.

<sup>3</sup> Article in *The World Today*, February, 1911.

<sup>4</sup> Acworth's *Elements of Railway Economics* (1904), Chapters III-V.

that during the period 1880 to 1898 ton-miles for all the railroads of the United States had increased 214 per cent, while operating expenses had only grown 121 per cent. No reference was made to the principle of increasing returns as distinct from or corollary to the principle of fixed cost.

To assume that a large part of total cost is fixed, and will not vary with the amount of traffic, obviously fails to take into account railroad dynamics. As any railroad grows in size, its interest charges and its maintenance costs must increase. A small local road may operate without substantial change for a period of years, but the large systems typical of present-day railroading must continue to increase their facilities year in and year out, the process of growth being fairly constant, though dependent to some extent upon industrial conditions and money rates.

It is a recognized principle of practical railroad management that the maintenance charges must bear a normal ratio to the gross revenues — prior to the war, about thirty per cent. When traffic falls off very suddenly, as in 1920-21,<sup>1</sup> maintenance expenditures are not immediately reduced, but sooner or later shops are closed and measures taken to reduce expenditures.

With respect to salaries of administrative officers, and office expenses, there is doubtless less fluctuation than in other sections of the railroad income account. However, drastic cuts in the salaries of high officials were announced by many roads in 1921. At any rate, whether or not such expenses vary much with traffic conditions, they constitute only about one per cent of the total railroad costs.

To assume, then, that any considerable part of joint cost is fixed and changeless seems to be directly contrary to the facts in the case, so far as average present-day conditions and financial policies are concerned. Modern railroads do not seek any large amounts of new traffic at rates which af-

<sup>1</sup> Freight traffic (ton-mileage) declined approximately one quarter. The largest previous decrease for any one year since 1908 was eight per cent.

ford only specific costs and a contribution to existing total joint cost, for the reason that the new traffic will itself bring about a larger total cost. In some cases the causal relation between the new traffic and the increased cost can be directly noted,<sup>1</sup> as where branch-line expenditures are made or new equipment of a special type purchased. But in most cases the addition or betterment which increases the joint cost is due merely to the general crowding of the facilities used in common by the mass of traffic. Such crowding reduces operating efficiency, increases the direct cost of transportation, and makes it advisable to improve or adjust the transportation machine.

There are at least four departments in which a railroad may increase its facilities: (1) car capacity, by obtaining new equipment, etc.; (2) train capacity, by diminishing grades and using stronger motive power; (3) track or movement capacity, by improving the road and arranging more efficient schedules; (4) terminal capacity, by expanding the yards, sidings, and station structures. Any one of these four phases of growth may present an emergency problem as the railroad expands to meet the demands of the traffic; for any one of the four may be a "limiting factor" at a particular time — that is, improvements in any or all of the other factors would not increase capacity. It is evident that the process of growth will tend to become steady and uniform in the larger roads, however.

From the various considerations advanced — theoretical, historical, and practical — it is evident that the second point by which Professor Taussig supports his joint-cost doctrine of rates (namely, that additional traffic may be secured without adding to "fixed" cost) is also untenable, at least on the basis of railroad dynamics and modern transportation conditions.

<sup>1</sup> This principle was clearly stated by Dr. Hadley (*Railroad Transportation*, p. 265), although he did not carefully analyze the problems of joint cost.

## CHAPTER VIII

### THE MONOPOLY THEORY

THE theory that discriminations are due almost solely to the exercise of monopoly power by the railroad was elaborated by Professor Pigou, the English economist, in his debate with Professor Taussig already referred to. But it is difficult to see how monopoly can explain all rate discriminations. A road which monopolizes certain traffic can "charge what the traffic will bear" to the fullest extent. But competing roads will also find it to their advantage to enter into traffic agreements or understandings with respect to high rates on luxuries, since such traffic is not usually susceptible to special development, and does not constitute the most important part of the business. These agreements are embodied in the uniform classification, applicable to traffic over all roads in the territory.

Monopoly is most likely to be exercised with respect to local or specially controlled traffic — which does not, however, constitute an important part of the total business of the average railroad.<sup>1</sup> The exercise of such power is subject to several checks. Local shippers, who as individuals would find themselves powerless to combat the railroad, combine into chambers of commerce or manufacturers' associations, in order to defend their rights and appeal to regulatory bodies. Moreover, the communities forced to pay monopoly tribute (either as to rates or service received) suffer an industrial handicap, their growth is stunted, and sooner or later traffic will decline and monopoly profits disappear. One of the most important considerations in the location of new factories is the character of railway services and rates; and even

<sup>1</sup> By "average railroad" is meant one of typical size, such as a Class I railroad (having operating revenues of over a million dollars a year).

factories long established may relocate if unfair rates make competition difficult with factories in other territories.

Small local roads, which, in the absence of any effective competition or regulation, should be able to take full advantage of such natural monopoly power, do not necessarily show large profits because of this factor. Some of them are owned and operated to serve particular industrial concerns, however, and whatever profits or losses occur are absorbed in the earnings of these enterprises as a whole.

It is doubtful, therefore, whether monopoly plays an important enough rôle to explain any one form of rate discrimination, except perhaps the long-and-short-haul practice.<sup>1</sup> This practice may occur either through competition for the long haul between two railroads, or competition between a group of roads and a group of carriers by water. For example, because of competition via the Panama Canal the transcontinental roads charge lower rates (on west-bound traffic) to the Pacific coast than to many cities a considerable distance inland.

But the fear of monopoly has always remained present in the public mind. Governmental bodies have continued to emphasize the importance of maintaining competition, to supplement the control exercised by commissions. Even in the recent Esch-Cummins Act, the section requiring the Interstate Commerce Commission to report a plan for the consolidation of all the roads into a limited number of systems contained the proviso that "competition shall be preserved as fully as possible."<sup>2</sup>

But monopoly has apparently played no great part in the development of railroad earning power. The most prosperous roads are not those which can avoid competitive rate-making, but the ones which enjoy the lowest production costs be-

<sup>1</sup> To some extent — but not wholly — this practice may be justified by relative costs, the much greater volume of traffic to the large competitive points reducing the terminal as well as the transportation costs.

<sup>2</sup> Transportation Act of 1920, par. 184.

cause of natural advantages of location, efficiency in operation, or low debt and good credit. Since the roads with good earnings enjoy the best credit and are able to borrow more cheaply than the poor roads, it follows that they are able to take greater advantage of the principle of increasing returns. However, a weak road may obtain some corresponding reduction in cost by passing through receivership and scaling down its interest charges. Hence, over a considerable period of time the principle of competition between the stronger and the weaker roads retains much of its effectiveness, and the stronger road is prevented from strengthening itself unduly.

While the monopoly theory may explain in part discrimination with respect to distance rates, it does not serve to explain discrimination in the classification of commodities, or discrimination as between services. It is, therefore, unsatisfactory as a general theory of rates.

## CHAPTER IX

### CONCLUSIONS AS TO DISCRIMINATION AND THE THEORY OF RATES

HAVING reviewed the various theories of discrimination and found none of them completely satisfactory, it is necessary to build up a composite theory of rates by a series of statements, in which we may include the important principles of rate-making in their proper relations:

1. So far as he is able to do so, the traffic manager of the individual railroad will fix rates so as to obtain maximum net returns from all traffic for a period of years. Because of varied traffic conditions, competition, Government regulation, and the practice of fixing rates for groups of roads, he may have great difficulty in adjusting rates to this end, but it nevertheless remains his guiding principle.
2. During a period of keen competition with other carriers (land or water) discriminations in local freight tariffs are initiated — such as export differentials in the East and long-and-short-haul rates in the South and West; and these discriminations tend to remain a fixed part of the rate system even though competition thereafter becomes less active. The amount of the discrimination cannot be fairly measured by the full difference in the rates, because greater volume of traffic may justify a somewhat lower rate for the traffic favored.
3. The practice in regard to local freight tariff discriminations may be facilitated by fixing higher tariffs at points where competition is less active or is alto-

gether absent, thus indicating the exercise of limited monopoly power with respect to traffic to and from such points.

4. In classifying goods for transport the element of competition is less important than in the fixing of distance tariffs. In the beginning rates were fixed largely on the basis of the value of the commodity in relation to its bulk and weight.<sup>1</sup> Moreover, where basic or standard rates became established, on which there was general agreement and which lent themselves to comparison, the subsequent fixing of tariffs or classifications was frequently influenced by these basic rates, or affected through comparison with them. To some extent the adoption of value as an important element in rate-making has been warranted by the higher cost of handling and caring for the more valuable articles, and also because they now form a much smaller proportion of the total traffic than originally. But there was *in the first instance* no sufficient justification for discrimination on the basis of value, to the extent practiced; and in the same manner as the distance tariff discrimination, it has tended to encourage excess transportation in raw materials as compared to finished products, thus promoting over-centralization of the basic manufacturing industries.
5. The discrimination in favor of long-haul and low-value traffic, raw materials and other bulky products, export traffic, etc., originally resulted (principally in the seventies and eighties) from an effort to stimulate traffic in order to support an overbuilt national rail-

<sup>1</sup> Bulk and weight might be further analyzed. J. F. Strombeck, in his book *Freight Classification* (1912, p. 59), states that "the elements affecting the minimum relative rate are: (1) dead weight, (2) car capacity, (3) movement of traffic, (4) risk assumed by carrier, (5) handling of freight at terminals and transfer stations, and (6) special requirements."

road system.<sup>1</sup> Thus industry became accommodated to such a system, and traffic development has to a large extent accommodated itself to the discrimination. In other words, *many differences in rates which were originally discriminations are now largely justified by the lower cost of hauling the heavy traffic.*

6. Because of a long-stabilized rate-making system, which has encouraged the gradual adjustment of traffic to rates and rates to traffic, the *average* (but not necessarily the individual), freight rate is probably now fairly close to the actual cost of transportation — including in "cost" a fair proportion of joint cost. This conclusion is supported by the following analysis of railway operating results:
  - a. *Transportation is essentially an industry of increasing returns or decreasing costs.* Cost decreases roughly in proportion to the density of the traffic — that is, the ton-miles or passenger-miles per mile of road. When a road is first built, a considerable amount of excess capacity exists. After this is exhausted, more elaborate facilities may be added at a smaller cost (in proportion to service performed) than the original plant.
  - b. This process cannot continue indefinitely, however. Extension of facilities (other than building of new mileage) becomes increasingly difficult and costly. Therefore the cost of transportation does not decrease directly as traffic density increases, but decreases at a declining rate.
  - c. Assuming that average rates are in general agreement with costs, we should find average rates for all roads declining as the density of traffic increases. We should also expect commodities with

<sup>1</sup> To-day we see the reverse of this situation. The congestion of industries in the cities has created a serious terminal problem for the railroads.

high density, large train-loading, and long haul (such as coal) to bear low rates as compared with commodities of the opposite character. The detailed statistical evidence tending to verify these conclusions will be found in the chapter following.

7. We have noted that over a long period of time discrimination tends to cure itself through adaptation of traffic to rates, and also that average rates tend to conform to cost of service. Nevertheless, there can be little doubt that our present rate system is honeycombed with differences and inequalities in rates, many of which deserve the name of discriminations.

There is unfortunately no accurate statistical method of measuring the extent and importance of discrimination to-day. However, the accompanying table indicates the wide discrepancies existing, which

COMMODITY (Carload lots)	TOTAL NO. OF ROADS REPORT- ING 1914	NO. OF ROADS REPORTING AVERAGE TON-MILE RECEIPTS AS INDICATED				
		Under .5¢	.5¢ to 1¢	1¢ to 2¢	2¢ to 5¢	Over 5¢
Live Stock and Dressed Meats.....	102	..	8	58	32	4
Grain and Hay.....	103	12	48	32	10	1
Cotton.....	77	13	23	20	19	2
Lumber.....	102	7	59	31	5	..
Coal.....	109	45	55	5	4	..

*Note.* The study was made for 110 roads—103 in Class I (gross revenues over \$1,000,000) and 7 in Class II (under \$1,000,000). If a greater number of small roads had been included, the variation in ton-mile receipts would undoubtedly have been greater. The results are for the year 1914, the latest year for which such data are available, their inclusion in the annual reports to the Interstate Commerce Commission having been discontinued in 1915.

The basic figures from which the above table was prepared are not contained in the annual statistical report of the Commission for 1914, but were obtained from the manuscript reports of individual roads, as tabulated by H. H. Copeland & Son, to whom the writer is indebted.

are explainable only in part by differences in cost of operation or by the effects of competition.

8. While rates on the same commodity for different roads (when submitted to an averaging process) will be found to vary roughly according to density and other cost factors, an examination of the general averages for the United States as a whole seems to indicate that the value of the commodity has an important influence on the average commodity rate.

It is, of course, impossible to measure this effect accurately, or separate it entirely from the effects of variations in cost of transportation. Nevertheless, in dealing with results for the United States as a whole, we may fairly regard such factors as competition, long and short haul, etc., as being neutralized to a considerable extent in their effect on the averages.

The table given below (1914 returns for about two-thirds the total railroad mileage of the United States) seems to indicate, however, that the value factor is effective. For example: hay and cotton are similar commodities so far as weight, method of handling, density of traffic, and length of haul are concerned, yet we find that cotton, which is a more valuable commodity than hay, has an average rate

COMMODITY	RECEIPTS PER TON-MILE (cents)	EST. TRAFFIC DENSITY (approx. mil- lions of tons)	AVERAGE LENGTH OF HAUL
Bituminous Coal.	.457	213	133
Anthracite Coal. .	.602	36	169
Grain. . . . .	.639	62	226
Lumber. . . . .	.698	98	175
Dressed Meats. . .	.972	6	335
Hay. . . . .	1.016	8	159
Live Stock. . . . .	1.263	17	212
Cotton. . . . .	1.777	8	201

about seventy-five per cent higher. In the same way anthracite coal, which is more valuable than bituminous, has an average rate about one-third higher. This can hardly be accounted for by the greater average density of traffic for all roads, which in this case merely means that a larger number of roads carry bituminous coal — the train-loading is fully as large for the individual anthracite carriers as for the bituminous.

While there are so many complicating factors that it is dangerous to push these conclusions too far, it seems reasonable to assume that the statistical evidence offers some support for the widely held theory that value affects commodity rates.

## CHAPTER X

### A STATISTICAL STUDY OF THE LAW OF INCREASING RETURNS IN TRANSPORTATION

THE effect of increasing returns on railway earnings and rates was illustrated in the previous chapter by a comparison of traffic density and rates. Because of the importance of this principle in rate-making and the fact that heretofore no similar analysis has apparently been attempted, it may be worth while to investigate —

- (1) the operation of increasing returns in the history of American railroads; and
- (2) the relation between traffic density and cost of transportation.

#### (1) "INCREASING RETURNS" AS INDICATED BY THE TREND OF RATES AND EARNINGS FOR ALL ROADS

While steam transportation actually originated about 1820, a comparatively small amount of mileage was constructed up to 1860, and reliable statistics as to rates are not obtainable until about the time of the close of the Civil War. During the seventies and eighties railroad building proceeded in advance of the growth of traffic, but nevertheless there was a fairly steady decline in rates, as indicated in the table following. The decline during 1890 to 1910 was not so marked, although it would naturally be expected that with the close of the period of rapid construction the law of increasing returns would effect a considerable reduction in rates. When the change in the purchasing power of money (as indicated by Dun's index numbers of wholesale prices) is taken into account, however, the adjusted rate figures show the anticipated trend. Thus the average "rate" for 1890, 1.02 cents, was the same as that for 1867, but by 1910 it had declined to .63 cent, and by 1920 to .40 cent.

TENDENCY OF FREIGHT AND PASSENGER RATES IN THE  
UNITED STATES

YEAR	AVERAGE REVENUE PER TON-MILE <sup>1</sup> (cents)	AVERAGE REVENUE PER PASSENGER- MILE <sup>1</sup> (cents)	RATES IN TERMS OF PUR- CHASING POWER <sup>2</sup>	
			Average Revenue per Ton-Mile (cents)	Average Revenue per Passenger- Mile (cents)
1867	1.92		1.02	
1868	1.81		.99	
1869	1.70		1.06	
1870	1.88		1.26	
1871	1.79		1.24	
1872	1.85		1.23	
1873	1.60		1.12	
1874	1.51		1.06	
1875	1.42		1.05	
1876	1.23		1.06	
1877	1.27		1.15	
1878	1.28		1.33	
1879	1.15		1.18	
1880	1.21		1.11	
1881	1.17		1.04	
1882	1.10		.89	
1883	1.20		1.12	
1884	1.15		1.15	
1885	1.00		1.10	
1886	.98		1.10	
1887	.97		1.03	
1888	.95	2.35	1.00	2.47
1889	.92	2.17	1.02	2.40
1890	.94	2.17	1.02	2.35
1891	.89	2.14	.93	2.22
1892	.89	2.13	.99	2.37
1893	.88	2.11	.97	2.32
1894	.87	1.99	1.05	2.40
1895	.86	2.04	1.05	2.48
1896	.80	2.02	1.08	2.72
1897	.78	2.02	1.08	2.80
1898	.76	1.97	.97	2.52
1899	.74	1.98	.87	2.33
1900	.73	2.00	.80	2.20
1901	.75	2.01	.81	2.18
1902	.76	1.99	.74	1.95

<sup>1</sup> The ton-mile revenue figures for the years 1868 to 1888 are from the *Report of the United States Industrial Commission*, vol. xix, p. 280; for later years from the statistical reports of the Interstate Commerce Commission.

<sup>2</sup> Ton-mile and passenger-mile revenue figures, divided by Dun's index numbers of wholesale prices.

TENDENCY OF FREIGHT AND PASSENGER RATES IN THE  
UNITED STATES (continued)

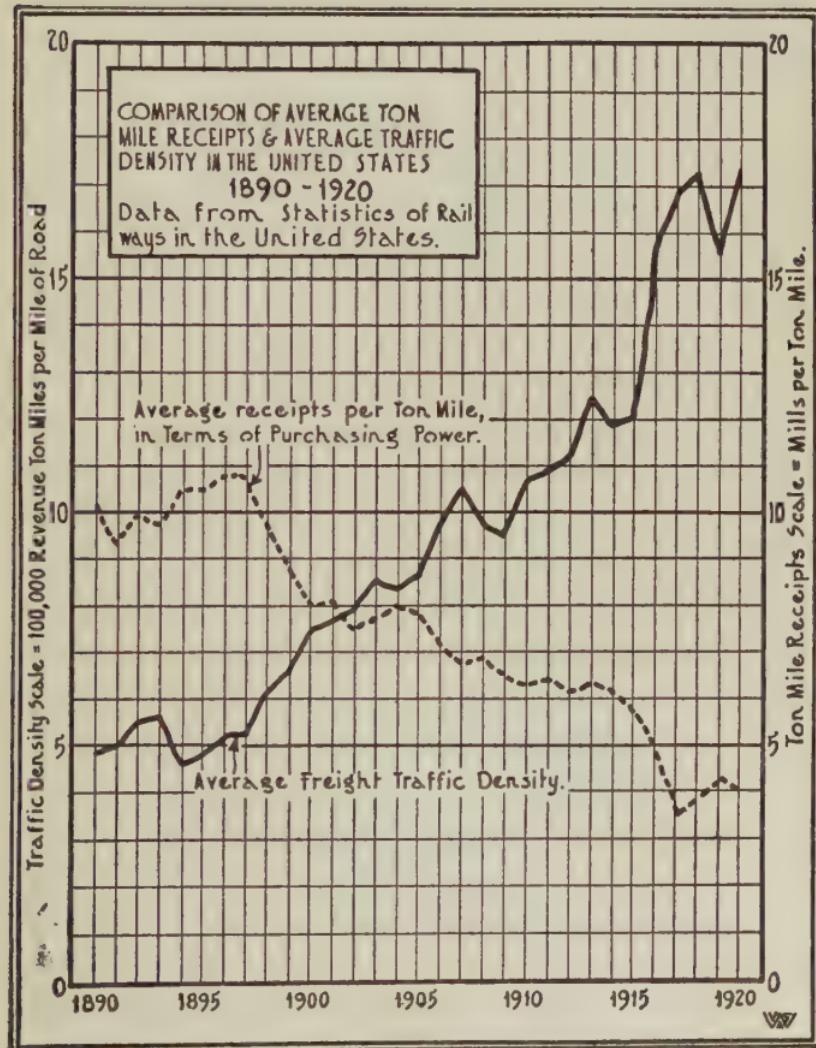
YEAR	AVERAGE REVENUE PER TON-MILE <sup>1</sup> (cents)	AVERAGE REVENUE PER PASSENGER- MILE <sup>1</sup> (cents)	RATES IN TERMS OF PUR- CHASING POWER <sup>2</sup>	
			Average Revenue per Ton-Mile (cents)	Average Revenue per Passenger- Mile (cents)
1903	.76	2.01	.77	2.03
1904	.78	2.01	.80	2.07
1905	.77	1.96	.79	2.00
1906	.75	2.00	.72	1.90
1907	.76	2.01	.67	1.76
1908	.75	1.94	.69	1.79
1909	.76	1.93	.65	1.62
1910	.75	1.94	.63	1.63
1911	.76	1.97	.64	1.67
1912	.74	1.99	.61	1.63
1913	.73	2.01	.63	1.73
1914	.73	1.98	.61	1.65
1915	.73	1.99	.58	1.59
1916	.72	2.01	.50	1.38
1917	.72	2.09	.34	.98
1918	.86	2.41	.37	1.03
1919	.97	2.54	.41	1.08
1920	1.05	2.75	.40	1.06

<sup>1</sup> The ton-mile revenue figures for the years 1868 to 1888 are from the *Report of the United States Industrial Commission*, vol. xix, p. 280; for later years from the statistical reports of the Interstate Commerce Commission.

<sup>2</sup> Ton-mile and passenger-mile revenue figures, divided by Dun's index numbers of wholesale prices.

The extent to which average rates for the United States have responded to changes in the average traffic density — in accordance with the conclusion reached in the preceding chapter — is indicated in the accompanying graph. Of course, the great increase in train-loading was made possible only by the invention of new devices and methods, but the fact that the traffic was available and that the traffic density might be increased doubtless stimulated such ad-

vances in the art of transportation. Whether lowered rates brought about an increase in traffic and in train-loading, or whether on the other hand larger train-loads brought about a decrease in costs and subsequently in rates, need not be analyzed. The fact remains that, whatever the relation of cause and effect, rates (or, more accurately, average receipts per ton-mile) have declined year by year in close agreement with the increase in traffic density. To what extent



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the rate decreases were due to increase in the proportion of low-grade to total traffic, and to what extent to greater density for all traffic, has not been determined, but doubtless both factors were effective.

The trend of average ton-mile revenues has, of course, been affected by Government regulation. This result was more evident in the earliest days of Government regulation, however. The special object of regulation during the early period was to eliminate rebates and the grosser forms of discrimination brought about by excessive competition, and this was undoubtedly a great benefit to most roads.

### FLUCTUATIONS OF PUBLISHED RATES AND TON-MILE RECEIPTS

(From *United States Industrial Commission Report*, vol. xix)

YEAR	AVERAGE TON-MILE REVENUE, U.S.	ACTUAL RATE INDEX <sup>1</sup>
1878	1.28	1.30
1879	1.15	1.18
1880	1.21	1.19
1881	1.17	1.07
1882	1.10	1.46
1883	1.20	1.42
1884	1.15	1.02
1885	1.00	.98
1886	.98	1.18
1887	.97	1.00
1888	.95	.82
1889	.92	.78
1890	.94	.81
1891	.89	.81
1892	.89	.81
1893	.88	.79
1894	.87	.79
1895	.86	.79
1896	.80	.79
1897	.78	.75
1898	.76	.70
1899	.74	.70
1900	.73	.70

<sup>1</sup> Average of actual published rates for various commodities between certain points.

The accompanying table compares the trend of average ton-mile receipts during the period 1878 to 1900 with an index number of *published* tariffs. The fact that such tariffs were ignored to a considerable extent in actual rate-making is indicated by the fact that the striking increases in the index in 1882 and 1886 were not reflected in the average ton-mile revenue figures. The effect of regulation in eliminating rebates is shown by the trend in ton-mile revenue as compared with the rate index after 1886 — the latter declining 38 points and the former only 6. The stabilizing effect of regulation on rates is also evident in the comparative changes before and after 1887, in either index.

It is evident from a study of the table on pages 81-82 that, following the period of rebate elimination (roughly 1890 to 1900), regulation tended to prevent the roads from exploiting the growth of industry and charging high rates, thus probably reducing their potential profits. More recently (as noted in the analysis of the work of the Interstate Commerce Commission since 1910) regulation has become unduly repressive, though a change in sentiment now indicates that the roads will receive fairer treatment in the future.

Thus far no mention has been made of fluctuations in the average ton-mile revenue caused by changes in the composition of the traffic. It is evident that if a larger proportion of high-grade commodities are shipped in one year than in another, the average ton-mile revenue will be higher even if rates remain the same. Thus, the trend of average ton-mile revenue indicates only *approximately* the trend of an average of rates. Unfortunately, since only tonnage (and not ton-mileage) statistics are available for groups of commodities for the length of time required for an historical study, it is impracticable to revise the averages by making allowance for traffic changes.

In a very rough way, however, we may measure these changes by the alternate periods of depression and prosper-

ity. During depressions the proportion of high-rate commodities might be expected to decline considerably, because the consumption of luxuries is affected to a greater extent than that of necessities. Referring again to the table on pages 81-82, it will be noted that the average ton-mile revenue for all carriers declined steadily from eighty-nine cents to seventy-three cents during the period of depression 1893 to 1900, following which there was a gradual recovery to seventy-eight cents in 1904. About this time rate-making became more fully subject to the regulation of the Interstate Commerce Commission, which may account for the narrow range of the average (between seventy-five and seventy-seven cents) during the years 1905 to 1911.

In the previous chapter we studied the relations between the density of traffic and the trend of average ton-mile revenues. These factors combined produce the gross freight revenues per mile of road. The accompanying table gives gross and net revenues per mile for all railroads during the period 1871 to 1920. Several striking facts are evident from a study of the table: a remarkably steady decline in gross and net per mile from 1871 to 1878, representing the effects of the severe depression during that period; a brief recovery, followed by an irregular decline from 1882 to 1895; from that year on, a steady and rapid increase in gross and net up to 1917, explained by heavy traffic growth without much increase in mileage; from 1917 to 1920 a very rapid increase in gross due to war-time activity and rate advances, but a phenomenal decline in net due to mounting costs.

It is evident that the period of railroad growth during the past fifty years may be roughly divided in half: up to about 1895, expansion was in the form of new mileage, and development was of an *extensive* character; since that time, the growth has been *intensive* in character, existing mileage being greatly improved so as to handle a volume of traffic two or three times larger than before.

## RAILROAD EARNINGS PER MILE OF ROAD

(All United States Railroads)

YEAR	GROSS REVENUE	NET REVENUE
1871	\$ 9,040	8,177
1872	8,116	2,893
1873	7,947	2,775
1874	7,513	2,736
1875	7,010	2,585
1876	6,764	2,536
1877	6,380	2,307
1878	6,207	2,375
1879	6,280	2,610
1880	7,190	3,029
1881	7,676	2,928
1882	7,337	2,670
1883	7,461	2,702
1884	6,663	2,318
1885	6,265	2,185
1886	6,570	2,376
1887	6,861	2,444
1888	6,540	2,045
1889	6,455	2,063
1890	6,822	2,162
1891	6,852	2,136
1892	6,986	2,068
1893	6,971	2,069
1894	6,058	1,803
1895	6,097	1,804
1896	6,223	1,840
1897	6,228	1,884
1898	6,771	2,111
1899	7,161	2,272
1900	7,826	2,519
1901	8,270	2,668
1902	8,696	2,830
1903	9,301	2,887
1904	9,248	2,989
1905	9,643	3,135
1906	10,631	3,580
1907	11,556	3,699
1908	10,543	3,144
1909	11,133	3,912

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YEAR	GROSS REVENUE	NET REVENUE
1910	\$11,897	\$3,820
1911	11,883	3,746
1912	12,641	3,938
1913	13,157	3,738
1914	12,308	3,365
1915	12,754	4,180
1916	15,019	5,178
1917	17,246	5,093
1918	21,149	3,915
1919	22,049	3,262
1920	26,168	2,447

The figures for net revenue per mile in the table do not present a very accurate picture of the trend of railroad profits, especially during the period 1910 to 1920. Operating expenses, while the most important item in cost of transportation, do not make up the total cost, which should also include taxes, rentals, and other items. Moreover, net income from operations does not mean a great deal unless brought into relation to the amount of the property investment.

The table following shows the net earnings from operation in relation to the property investment of the principal railroads in the United States, from 1908 to date. Figures prior to 1908 are not available for the United States, but results for the Eastern railroads (the figures for which were carried back to 1900 in the 1914 Advanced Rate Case exhibits) indicated that earnings increased rather steadily from 1900 to 1907, falling off in 1908 to about the same figure as in 1900—which facts agree fairly well with the trend of net revenues per mile for the United States.

The earnings for the years 1918 to 1920 are of little significance because during the period January 1, 1918, to September 1, 1920, the railroads were guaranteed a “standard return” by the Government, the amount in dollars being based (with adjustment for increased investment, etc.) on the average income for the three years ending June 30, 1917. The figures as given in the table represent actual operat-

RAILROAD EARNINGS<sup>1</sup>

(Class I Railroads)

YEARS ENDED JUNE 30 <sup>2</sup>	PROPERTY INVESTMENT (millions of dollars)	OPERATING INCOME <sup>3</sup> (millions of dollars)	RETURN ON INVESTMENT (per cent)
1908.....	\$13,213	\$ 645	4.89
1909.....	13,609	732	5.38
1910.....	14,557	826	5.68
1911.....	15,612	768	4.92
1912.....	16,004	751	4.69
1913.....	16,588	831	5.01
1914.....	17,153	705	4.12
1915.....	17,441	727	4.17
1916.....	17,689	1,043	5.90
1916 <sup>3</sup> .....	17,842	1,100	6.17
1917.....	18,574	986	5.31
1918.....	18,984	682	3.60
1919.....	19,272	509	2.64
1920.....	(approx.) 19,231	150	0.78
1921.....	(approx.) 18,574 <sup>4</sup>	614	3.31

<sup>1</sup> The figures from 1908 to 1919 were taken from the Interstate Commerce Commission's thirty-fourth annual report to Congress. The rate of return for 1920 is figured on property investment of the roads as of December 31, 1919, and railway operating income is partly estimated. The 1921 figures are taken from a compilation prepared by the Bureau of Railway Economics.

<sup>2</sup> For 1916-21 the figures are for calendar years.

<sup>3</sup> Operating income means operating revenues less operating expenses, taxes, and operating rents (as distinct from rents for lease of road and miscellaneous rents).

<sup>4</sup> Tentative valuation fixed by Interstate Commerce Commission slightly lower than property investment actually reported by the roads.

ing results under Federal operation set in form comparable to figures for previous years. They do not indicate the amounts actually obtained by the roads.

In September, 1920, the Interstate Commerce Commission, acting in accordance with the policy laid down in the Esch-Cummins Law, raised all freight rates about one-third and all passenger rates about one-fifth.

About November 1st a very severe industrial depression began, reducing the amount of the traffic in some instances as much as forty per cent in the winter of 1920-21. Traffic for the year 1921 was about twenty-five per cent less than that for 1920 — this decrease being by far the greatest ever recorded in one year.<sup>1</sup> The result was that earnings during this period were entirely subnormal.

## (2) THE RELATION BETWEEN TRAFFIC DENSITY AND COST OF TRANSPORTATION

The preceding method of analyzing the law of increasing returns did not fully illustrate the workings of the principle from the earliest stage of railroad development. To do so it would be necessary to study the average rates during the period 1830 to 1860, during which the system of steam transportation had its beginnings. While the early roads were largely experimental, nevertheless, the figures would be of interest to indicate the operation of the principle when transportation was in its infancy. But a study of this period seems impracticable owing to the incompleteness of the records. Also, it is doubtful whether the workings of the principle could be clearly discerned even if the figures were available, because earnings and rates were affected to such an extent by public support given the roads (land grants, etc.), by the rebate system, the numerous changes in organization, etc.

To avoid these arbitrary factors which enter into an historical study, and to obtain a more complete analysis of the principle of increasing returns, it may be worth while to compare the conditions and results as of some recent year for various railroads in different conditions of size and growth. By analyzing the characteristics of typical railroads of different types as revealed in the group averages, we can ascertain the workings of the principle of increasing returns as based

<sup>1</sup> The 1907 panic and depression resulted in a decrease of about eight per cent and the outbreak of the war in 1914 caused about the same decline.

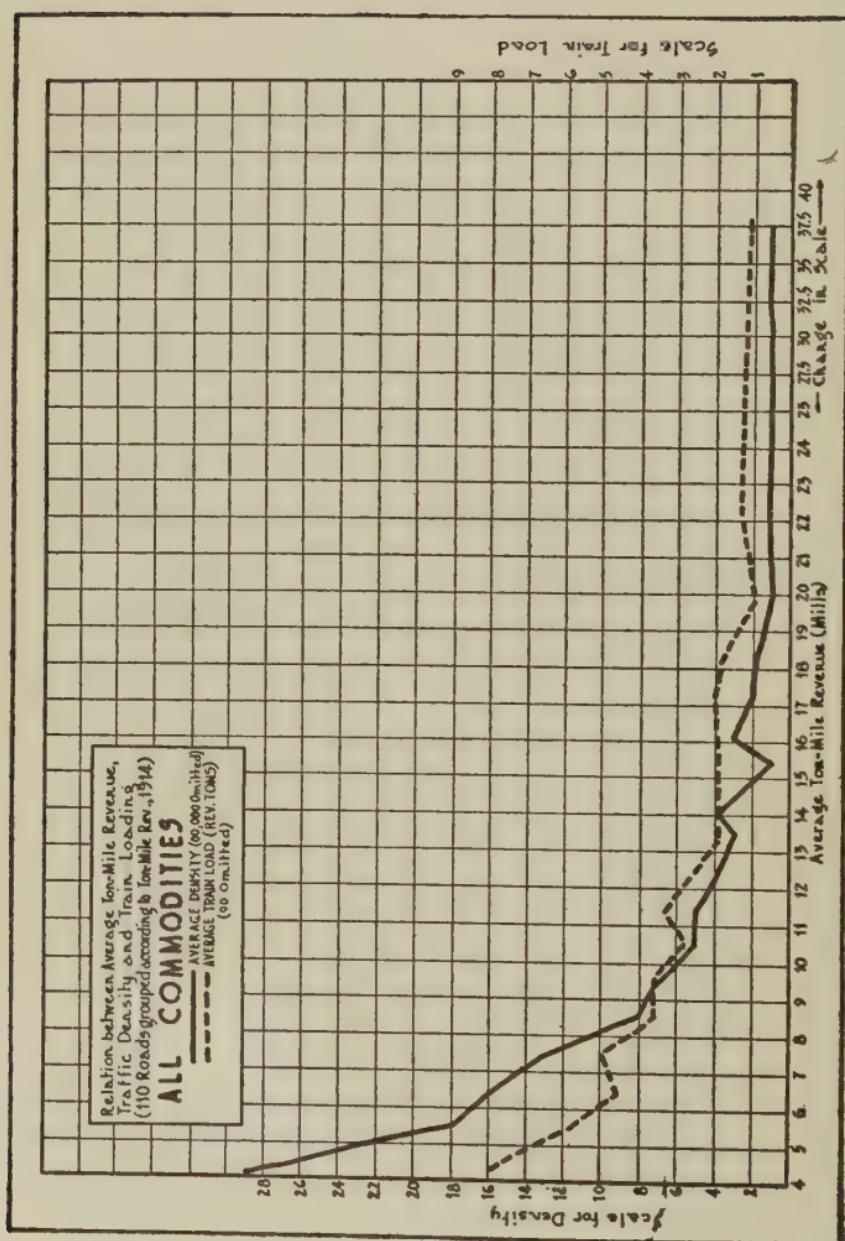
upon modern conditions and without respect to historical changes in operating methods. The principle will thus be limited in application, being based on magnitude of operations only and without respect to historic changes in the development of transportation, technique, and the character of the traffic, and the results may thus be more easily interpreted.

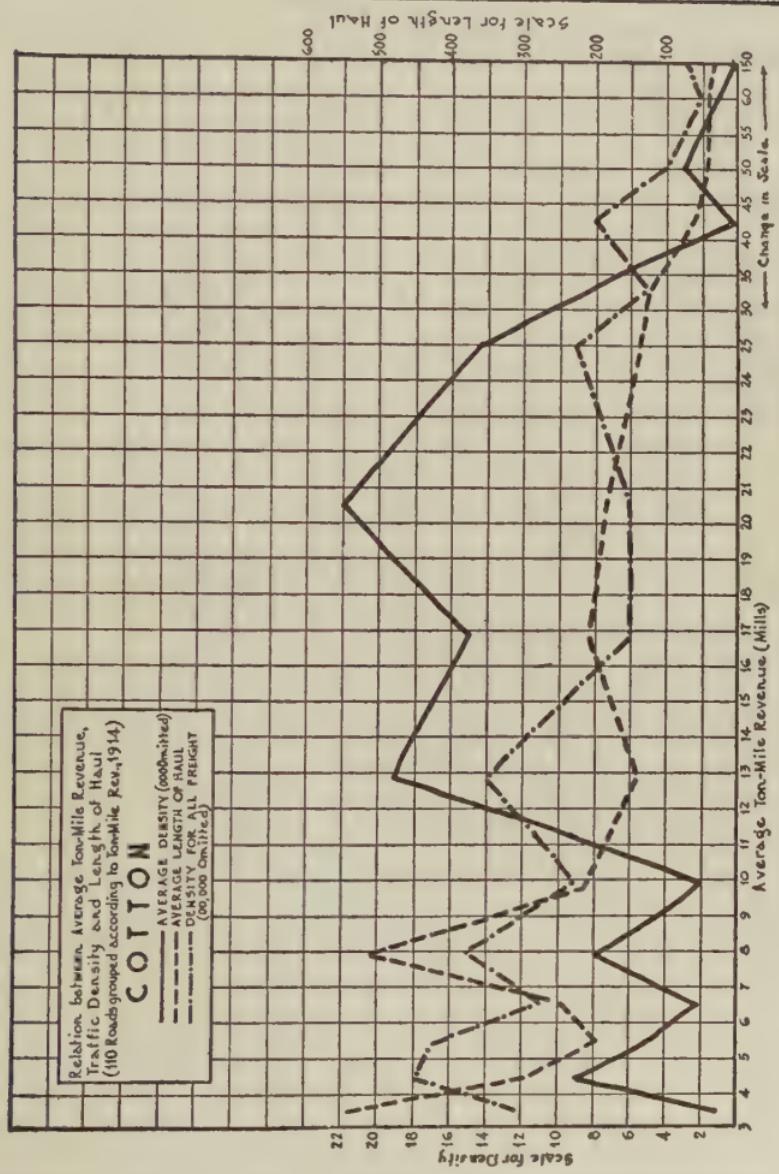
This method of statistical analysis will also enable us to study the relations between rates and traffic density for individual commodities (which relations could not be compared over a long period of years because the data are available only for a limited period).

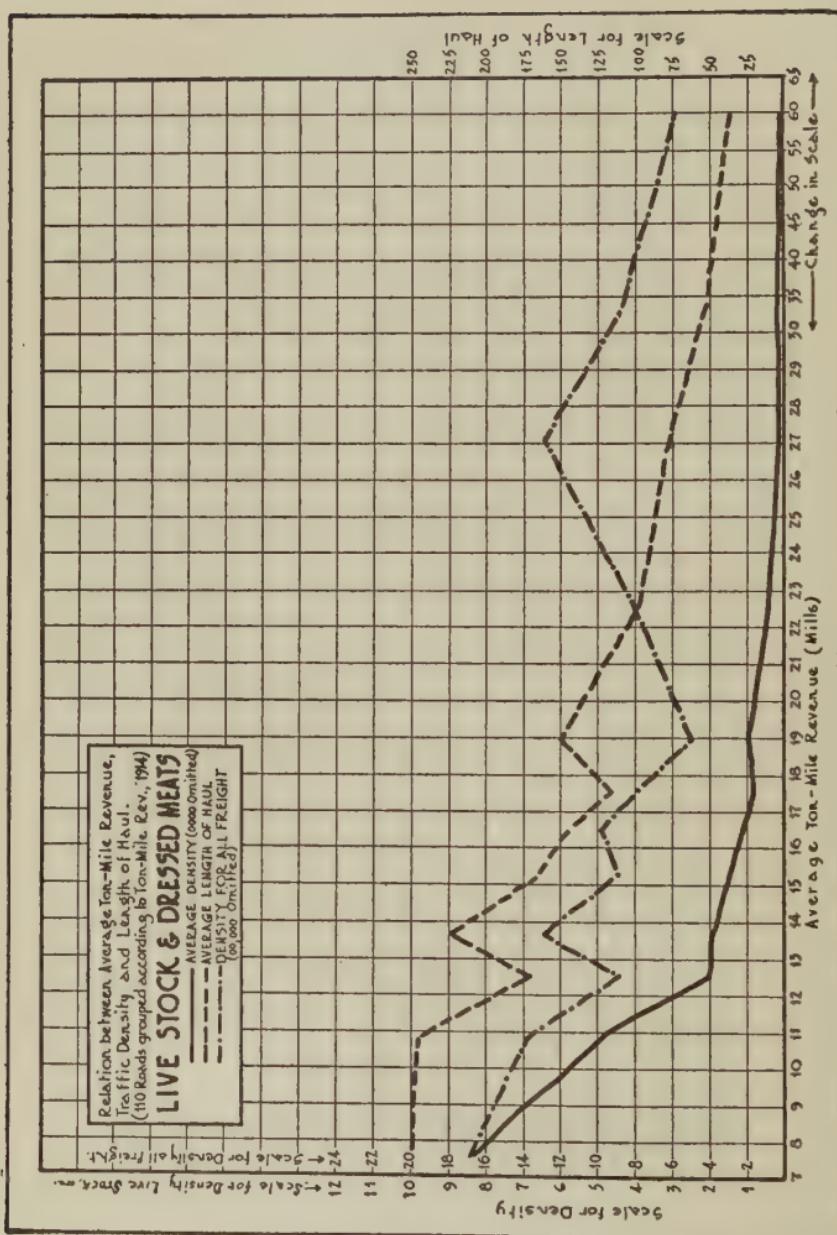
The accompanying graphs are based on a group classification of one hundred and ten large railroads according to the average ton-mile receipts for five commodities and for total traffic in the year 1914.<sup>1</sup> While, as already indicated, there is a wide variation in individual receipts per ton-mile for the same commodity, even for roads in the same territory or on a competitive basis, the graphs indicate that when a number of roads which receive about the same ton-mile receipts are grouped together, such average receipts bear an approximate relation to the average density of traffic for the given commodity, as well as to the average length of haul. Only one out of the five commodity graphs (cotton) fails to show a fairly consistent relationship, probably due to the fact that the heaviest density for this traffic is on Southern roads. Even here, however, the factors of length of haul and density for all freight show the anticipated trend.

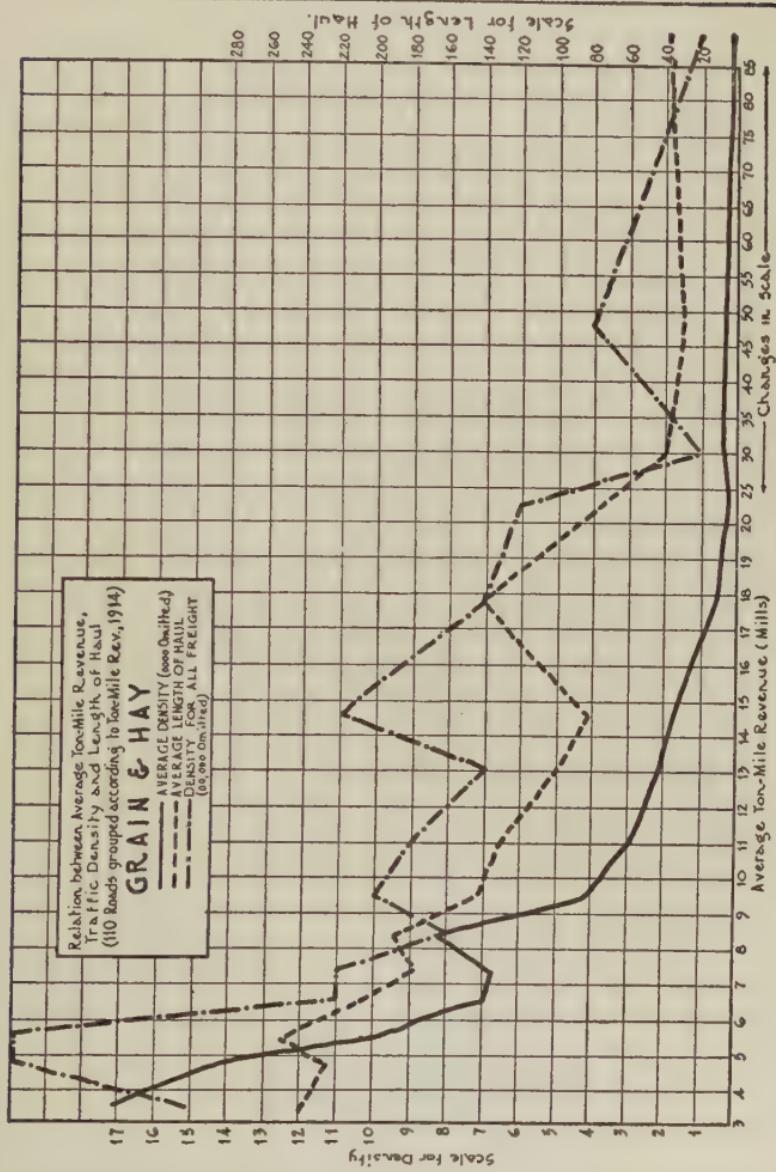
The graph for "All Commodities" seems to be more consistent than those for the individual commodities, as might be anticipated, but in interpreting this graph it must not be forgotten that there are varying proportions of different commodities represented at different points in the curves.

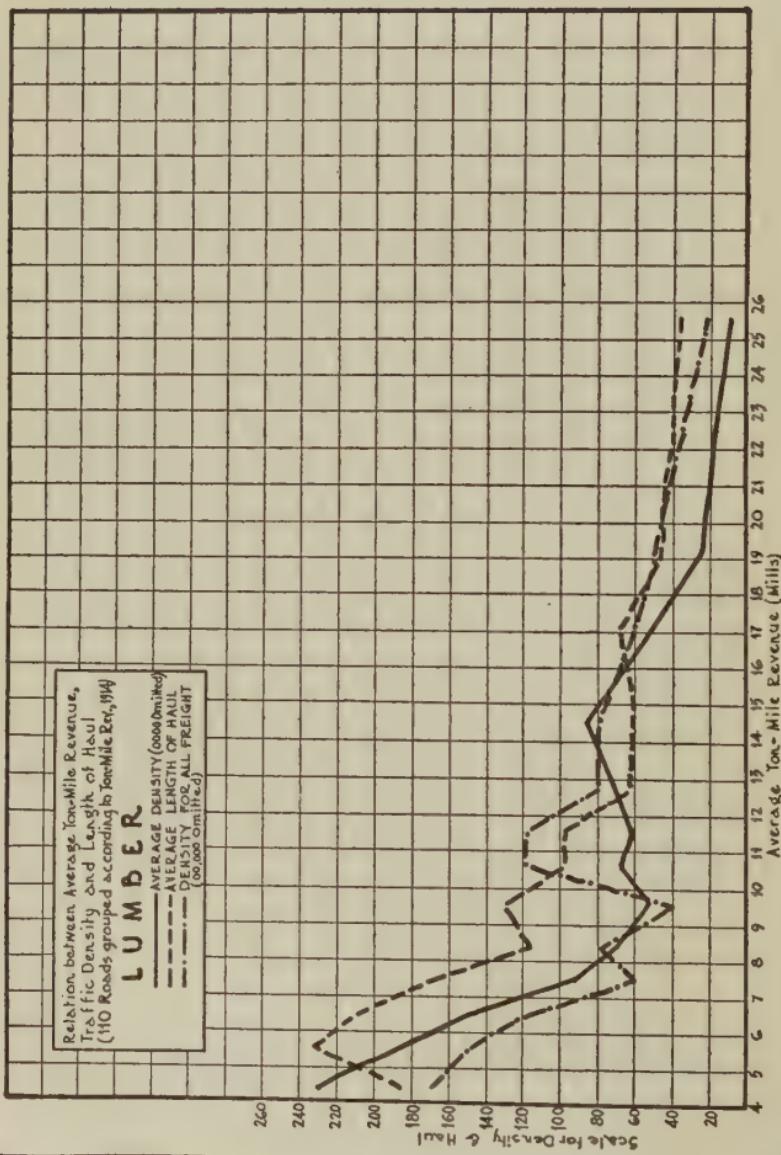
<sup>1</sup> See detailed explanation in note on page 77, which applies to the method of preparation of these graphs. The year 1914 is the latest for which results are obtainable.

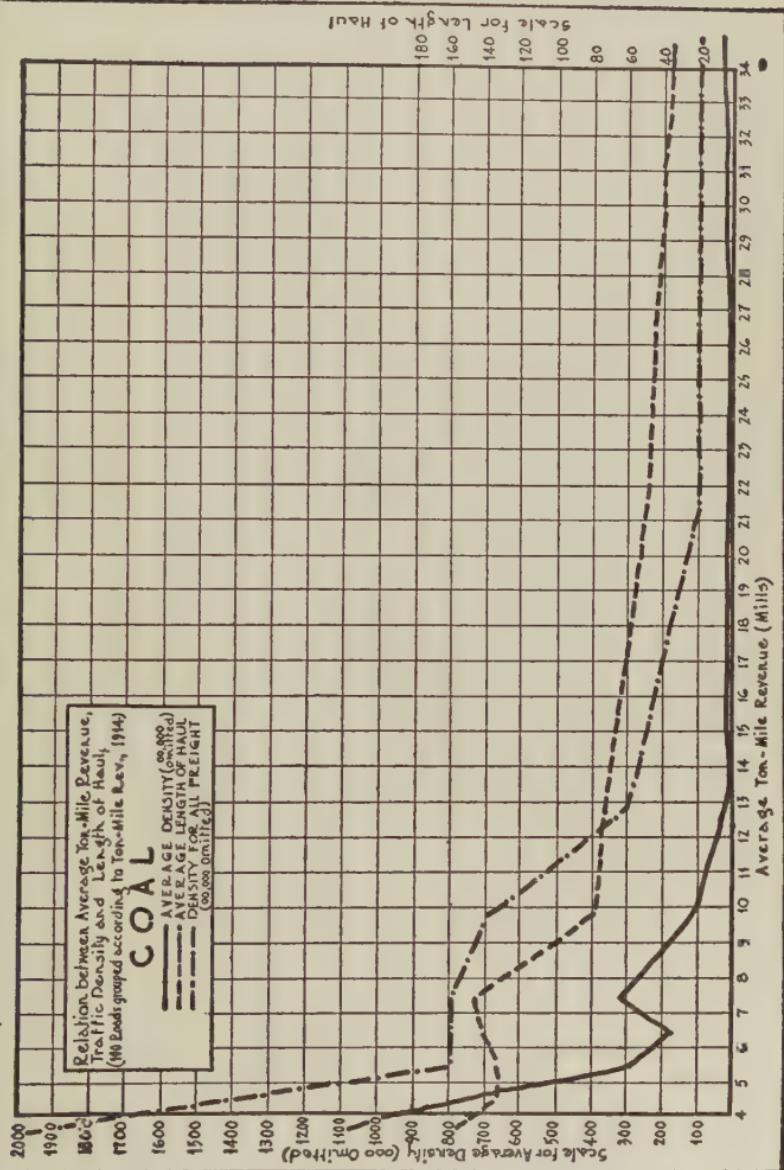












In the previous discussion it has been assumed that the cost of transportation will vary about in proportion to the density of the traffic and the length of haul. While there are no definite cost data available by which to bear out this assumption, the fact that train-loading is, in general, aligned with density of traffic (see graph "All Commodities") is a strong point in support of such a contention.

The character of the fluctuations in density, length of haul and train-load in the graphs seems to indicate that the principle of decreasing costs does not operate uniformly, but tends to approach a limit. It is obvious that the economies due to increasing length of haul would not be very effective after, say, 100 miles had been passed. It also seems evident that there are physical limits (under any given set of conditions) to the efficient increase in train-loading.

Moreover, in considering the trend of operating costs there is an important factor besides length of haul and train-loading. This is the handling of the trains over the tracks. How many trains can be economically passed over a given mile of track in a given length of time? Theoretically, there would be almost no limit, for freight trains might be imagined as passing in a solid procession with mere safety intervals between. Practically, the matter is not so simple. Freight and passenger trains must in many cases use the same tracks, and even freight trains have a variety of schedules, depending upon whether they are "fast freight lines" carrying perishable goods, ordinary service trains, or merely strings of empties. Moreover, all freight trains must be "made up"; that is, the cars must be sorted and put together in the switching and terminal yards. Hence the size and efficiency of the yards, the location of the passing or side tracks, the adequacy of the signal system, etc., all have a direct bearing on the operating schedules. It seems evident, then, that the principle of increasing returns must approach a practical limit in the matter of train-operation, just as in the matter of train-loading.

But cannot the railroad expand its facilities, eliminate curves and gradients, build new yards and extra trackage, and thus again permit an increase in the number of trains? This is exactly what has been done in the past, millions of dollars having sometimes been spent in reconstruction of roadway to save a few minutes in train schedules. But to-day the problem is somewhat different. Terminal facilities have become cramped and crowded owing to the great increase in traffic density. In most cases the terminal yard forms the "neck of the bottle," and traffic on the main lines cannot flow freely while the yards are clogged with cars. For example, the New Haven Railroad, which has become a sort of vast terminal yard, was badly congested during 1919 and 1920, its average mileage per car per day being only about half the average for the United States.

As a general conclusion it may be said that the principle of increasing returns has nearly ceased to operate for some of the largest roads. An important factor in terminal congestion is the greatly increased cost of city land and the consequent difficulty of expanding yard facilities. Nevertheless, if sufficient attention is paid to the terminal problem in the next decade or two it is quite possible that the working of the principle may again be extended with respect to train movement.

This possibility calls attention to the necessity for distinguishing between the application of the law of increasing returns in a static system (that is, that existing at any given time) and its application to transportation considered in the historical or dynamic sense. In this chapter the statistical evidence has been analyzed both with respect to the various kinds of transportation existing at a given time (static) and the changes in the transportation system as a whole for the period 1867 to 1921 (dynamic). In considering the principle in its dynamic application, the importance of fundamental changes in the art of transportation must be noted. Thus the general electrification of railroads may

in future effect a considerable change in rates and costs, just as the development of new features in the steam locomotive has done in the past. Unfortunately we cannot easily apply any statistical test to this dynamic factor of advance in the art of transportation. We may, however, safely assume that in the future new inventions and methods, as well as the further consolidation and integration of the transportation industry, will permit a further general decline in average transportation costs and rates — though probably at a much slower rate than in the past.

## CHAPTER XI

### THE LAW OF INCREASING RETURNS IN THE LIFE-HISTORY OF THE AVERAGE RAILROAD

THE life-history of the typical railroad may be roughly divided into the following periods for the purpose of studying the application of the law of increasing returns:

1. The period immediately following construction, when joint cost will remain nearly fixed, and the average unit cost of transportation will decline rapidly with every increase in traffic. The law of increasing returns applies with particular force to this period.
2. The early stages of system-building, during which the rapidly growing road will find itself in alternate periods of under-capacity and over-capacity. When traffic exceeds capacity, efficiency will decrease and direct costs of operation will increase rapidly, so that there will be a short period of decreasing returns. As soon as the road can secure new capital on favorable terms, however, it will double its track or eliminate curves and reduce grades, in order to speed up the service. In double-tracking there will be a considerable saving in cost of land, filling and cutting, etc., as compared with original cost. In many cases, also, no additional right-of-way need be purchased. There will be some increase in the joint cost, but a net gain will result because of the reduction in direct costs, and the road will again enter a period of increasing returns. Perhaps it now finds that it has excess main-line capacity, and will buy up extensions, feeders, or branch lines in order to acquire more "through" traffic. Soon it will again reach and pass through a period of decreasing returns — and so on in a series of cycles.

3. When the road reaches a certain size and becomes a "system," its development becomes less spasmodic and more uniform. Growth is, of course, still dependent on industrial and financial conditions, but there are no radical changes in the whole system comparable to the double-tracking of the road in its early history. Since capacity can be better regulated to equal available traffic, the trend of decreasing costs will be slowly but steadily upward, instead of alternating in zigzag fashion with periods of increasing costs. During this period (and from time to time in the second period) such factors as the following bring about decreasing costs:

- a. Greater traffic density, resulting in improved train-loading, more efficient schedules, etc.
- b. Development of bulky low-grade traffic, such as coal, bringing about large economies in loading, switching, and unloading cars, as well as in train operation.
- c. Development of long-haul and "through" traffic to distributing gateways or export points, such traffic being obtained from feeders in much the same way that a great river gathers its waters from tributary sources.
- d. Rapid advance in the art of transportation, due to the constant flood of new inventions. Pressure has also been exerted by Government bodies for the adoption of safety or efficiency devices, such as the automatic coupler.
- e. Uniformity in operating methods and coöperation between roads, effected by numerous railroad societies (now numbering about two hundred in this country), as well as by the connections between financial interests controlling the roads.
- f. A higher degree of executive efficiency brought

about by centralized administration and selection of officials on the basis of fitness.

- g. Economies in purchasing, due to large-scale buying.
- h. Obtaining new capital on better terms, due to growth and stabilized credit.
- i. Development of "good-will" as a traffic factor, through advertising, inaugurating special services, establishing records for service or safety, etc.

4. A long period of increasing returns is frequently succeeded by one in which a reversal of form appears, and the road encounters decreasing returns. While this phase is not a necessary part of railroad evolution, it is typical of the actual history of so many large systems as to be worthy of careful analysis. When this period begins, the road can usually live on its credit and resources for a time, but unless retrenchment measures are effected, the road will enter receivership eventually. Causes which may operate to bring about this period of decreasing returns are:

- a. Nepotism or favoritism in selection of executive officials, with consequent rapid decline in administrative efficiency.
- b. Lack of *esprit de corps*, and decline in the morale of employees.
- c. Loss of traffic due to competition or changes in industry and commerce.
- d. Inefficiency due to over-centralization of operating management.
- e. Unwise or over-rapid system-building, or entering into fields other than railroad transportation. The break-up of the Gould system is traceable to the former policy, and the difficulties of New Haven largely to the latter.
- f. Decline of credit due to stock-market manipulation of securities.

- g. Terminal or yard congestion, and the high cost of land for needed expansion of facilities. Congestion checks the normal increase in train-loading and hampers car movements.
- h. Rises in wages, material costs, etc., without any corresponding rise in the general level of rates. These forces affect all roads alike and may force already-weakened roads to the wall.
- i. "Skimping" of maintenance to continue dividend or interest payments.

5. As an outgrowth of period four, the road passes into receivership.<sup>1</sup> During this period, which may last as long as five years or more, dividends and a considerable portion of interest charges are not paid, and the funds thus obtained are devoted to increased maintenance, additions, and betterments, and the general restoration of the property to a condition of efficient operation. Needed capital may also be acquired by the issuance of receiver's certificates, which rank ahead of all other securities.

6. The successfully reorganized railroad, with new working capital supplied by assessment of stockholders, finally emerges from receivership. The mistakes of the past have been ameliorated by scaling down its debt and fixed charges — sometimes as much as one-half; its physical property has been largely rebuilt, and its administration reorganized; while its dividend policy will probably remain for

<sup>1</sup> Perhaps the period of receivership should not be included as a stage in the normal evolution of a railroad system. A study of such figures as are available, however, indicates that nearly two-thirds of the present railroad mileage in the United States has passed under receivership since 1880 alone, and over one half has been sold under foreclosure since that date. (This takes no account of abandoned mileage, for which no figures are available, or of duplication due to the same mileage going under receivership twice, which two factors would perhaps about offset each other in the calculation.)

some years under the control of conservative voting trustees. It may now enter into an indefinite period of increasing returns, though it may quite possibly again encounter a period of mismanagement or traffic decline, leading to a second receivership.

Many of the points in the above analysis pertain more especially to the freight service. Passenger fares would probably not have decreased as fast as they have, had it not been for statute requirements. The principle of increasing returns has been only partially effective in the case of the passenger service, because there are a number of factors working against the downward trend of transportation costs:

1. Passenger transportation in the United States has not grown so fast as that of freight, and the development of economies in operation has therefore been slower. An increase in the volume of traffic does not necessarily result in an economy of handling, except where a larger number of passengers per train can be carried. The United States Industrial Commission in 1902 called attention to the greater tendency of increasing returns in the freight service as compared with the passenger service, citing figures to indicate that a similar situation prevailed in Europe and the United States.
2. There has been less competition than in the freight business, and therefore less pressure to reduce costs. Competition has been principally in the higher-class service, with a tendency to raise rather than lower costs because of the greater luxury and safety of service offered. The construction of commodious all-steel coaches, and the operation of Pullman, club, and other special cars have added considerably to the

dead-weight tonnage, which is in the neighborhood of ninety per cent of total weight.

3. Governmental regulations as to service have been numerous — for example, cooled drinking-water must be provided, the number of trainmen is prescribed by law, etc. On many local divisions the roads are required to furnish a minimum amount of train service, even though operations result in a loss.

As already noted in Chapter IV, the Interstate Commerce Commission took cognizance of these conditions in its 1915 decision, by which the roads were granted a larger increase in passenger fares than had been allowed in freight rates up to that time. At the present time, however, the passenger business seems relatively about as profitable as the freight.<sup>1</sup>

<sup>1</sup> See pages 112-13.

## CHAPTER XII

### A REVIEW OF ATTEMPTS TO DEVELOP A SPECIFIC COST FORMULA FOR TESTING DISCRIMINATIONS

In order to examine the problem of specific cost, it is necessary first to make an historical <sup>1</sup> review of the efforts to apply the cost basis in rate-making. Whatever cost methods have been used by the roads for the guidance of their own officials have usually been so incomplete or obscure as to serve no purpose whatever in rate regulation. Accordingly, the review divides itself into three sections: (1) the results obtained by experts employed in litigation over state regulation of passenger fares, and in other cases; (2) the policy of the Interstate Commerce Commission in regulating railroad accounts and statistics; and (3) the results arrived at by the accounting officers of certain roads in their efforts to develop formulæ for use in rate cases.

A triple accounting problem confronted the experts employed in the state passenger fare cases. First, it was necessary to devise a formula for separating freight from passenger expenses, as well as for the elimination of the cost of the minor services, such as mail, express, etc. Second, the fair value of the railroad property had to be determined (usually by appraisal) and a certain portion allocated to the passenger service. Third, since the litigation concerned only intrastate business, it was necessary to find means to divide the passenger revenues, expenses, and property value into two portions representing the intrastate and the interstate business, respectively. The amount of net in-

<sup>1</sup> Historical only in the broadest sense, however. Much interesting testimony might be included as to early efforts to solve the problem — such as the ingenious computations of President Fink of the Louisville & Nashville Railway — but these would not serve the present purpose.

come derived from the intrastate passenger business could then be applied to the investment value of the property devoted to such service, and if the resulting ratio was below a normal per cent (six per cent usually being considered a fair rate of return) the railroad's claim as to confiscation of property was upheld.

Because of the many problems involved in appraisals and in working out the intricate methods for division of expenses, much of this litigation — as, for example, the Duluth, South Shore & Atlantic Case in Michigan — dragged through the courts for many years. The changes in conditions from year to year required constant reconstruction of the exhibits and conclusions. The statistical results were complicated, and apparently no clear-cut body of decisions were obtained; moreover, the whole system of state rate regulation is now practically subordinated to federal administration, under decisions handed down by the Supreme Court. A detailed study of the methods used to separate expenses between the passenger and freight services in these intrastate cases would therefore be of little interest except from a purely historical point of view.

Most of these earlier formulæ employed by experts were based on the use of train-mile or locomotive-mile ratios. While car-miles were occasionally used to apportion some of the accounts, it was generally recognized that the use of this basis was unfair, because of the great dissimilarity between the passenger car and the freight car. Physical bases other than mileage ratios were not used to any considerable extent. In most cases about one third of the expenses were directly assigned (that is, without the use of a formula). A few accounts were divided in the ratio of gross revenues, though this was obviously fallacious for rate case purposes.

As progress was made in the development of a formula, the method of grouping unassignable accounts with related assignable accounts was adopted to a larger extent. In the

Post Office (Railway Mail Pay) Case of 1911,<sup>1</sup> a formula was adopted by the Post Office Department under which about thirty-four per cent of total expenses were directly assigned, forty-two per cent assigned on the basis of selected accounts, and twenty-four per cent on the basis of train and locomotive mileage. The "selected accounts" were principally those as to which a direct assignment could be made. Having obtained the amount of expenses and taxes chargeable to the passenger service under this formula for the period of a month, a part of this amount was apportioned to the mail service on the basis of car-foot-miles, with the indicated result that the mail service for all the roads showed an operating ratio of only about 74.3 per cent. The railroads attacked the validity of this result by showing the wide variation in results obtained by the use of different formulæ, and eventually won their case.

Turning now to the work of the Interstate Commerce Commission in developing a formula for separation of expenses, we recall the original attempt in 1888 by the Commission's statistician, Professor Henry C. Adams, to which reference was made in Chapter II. The results of this separation, published in the *Statistics of Railways for 1888-93*, indicate the following percentages of gross revenue remaining after operating expenses, for each service:

	FREIGHT (per cent)	PASSENGER (per cent)
1888 . . . . .	37.0	13.1
1889 . . . . .	40.2	8.0
1890 . . . . .	35.8	11.5
1891 . . . . .	35.0	10.9
1892 . . . . .	35.2	8.8
1893 . . . . .	34.0	7.3

<sup>1</sup> For a full description of the formula, see H.R. Doc. 105, 62d Congress, p. 9. It followed closely the scheme developed by the Wisconsin Railroad Commission (practically the only State commission to take an interest in the cost problem) in connection with the case of A. E. Buell *v.* The Chicago, Milwaukee & St. Paul Railway Co., decided February 16, 1907.

The abandonment of this scheme of separating expenses (based almost wholly on train mileage) was explained by Professor Adams in the 1892 report on the ground that "not more than half of the items of operating expenses can by any means be assigned to passenger and to freight service," and that "the average cost per ton per mile and per passenger per mile . . . was rarely used by Commissioners in judging of fair rates."

The revival in 1914 of the cost idea in the Commission's scheme of accounting practice has also been referred to (pages 10-11). The change in the Commission's attitude toward cost analysis may be traced largely to the influence of Commissioners Lane and Meyer. The latter had formerly been a member of the Wisconsin Railroad Commission at the time when the Buell formula (which later became the basis of the Post Office formula) was developed. It is noteworthy that the formula adopted by the Interstate Commerce Commission followed the general lines of the Post Office method in that a large part of the expenses were apportioned in the ratio of other accounts.<sup>1</sup>

The requirements of the Commission as to the filing of annual reports of the separation of expenses between services, following adoption of the "Rules" for such separation, have been modified from time to time as follows:

- 1915-16: Expenses "related solely" to one service or the other to be reported, and certain other expenses to be assigned on the basis of the rules, leaving an unassigned balance.
- 1917-19: Only expenses related solely to one service or the other to be reported.
- 1920: Same as 1915-16, except that the rules provided for the assignment of *all* expenses.

The new Rules proved more successful in one way than any of the old formulæ, for since the roads were required to keep sub-accounts on the basis of original vouchers and

<sup>1</sup> The "Rules Governing the Separation of Operating Expenses" (Issue of 1920) will be found in the Appendix, p. 137.

records, nearly two-thirds of all expenses were definitely classed as "solely related" to one service or the other. Moreover, the results, in so far as they can be compared with those reported in 1888 to 1893, are much more uniform and stable. The figures for "solely related" expenses of all roads for 1916-21 are set forth in the accompanying table.

RESULTS OF DIRECT ASSIGNMENT OF EXPENSES TO FREIGHT  
AND PASSENGER SERVICES, FOR CLASS I CARRIERS, BY  
DISTRICTS, 1916-21

(*Statistics of Railways, 1916-21*)

	EASTERN DISTRICT (per cent)	SOUTHERN DISTRICT (per cent)	WESTERN DISTRICT (per cent)	TOTAL U.S. (per cent)
<i>Per cent of total expenses directly assignable</i>				
1916.....	69.1	63.0	58.2	64.0
1917.....	69.0	65.8	58.4	64.1
1918.....	68.2	65.3	57.0	63.6
1919.....	68.7	63.0	57.2	63.3
1920.....	71.2	67.4	57.1	65.3
1921.....	71.5	67.5	58.8	65.9
<i>Per cent of directly assignable expenses:</i>				
"Related solely to freight service"				
1916.....	75.9	76.2	70.8	74.2
1917.....	77.4	77.0	72.6	75.5
1918.....	78.4	77.9	74.6	77.0
1919.....	76.3	76.7	73.6	75.5
1920.....	77.1	77.3	73.9	76.1
1921.....	74.3	75.2	71.6	73.6
"Related solely to passenger and allied services"				
1916.....	24.1	23.8	29.2	25.8
1917.....	22.6	23.0	27.4	24.5
1918.....	21.6	22.1	25.4	23.0
1919.....	23.7	23.3	26.4	24.5
1920.....	22.9	22.7	26.1	23.9
1921.....	25.7	24.8	28.4	26.4

In the 1916 figures, 36% of total expenses, about one quarter of the expenses not "solely related," were assigned according to the Rules, and about half remained unassigned.

In the 1920 and 1921 reports appeared the first attempt at complete separation of expenses for the United States since 1893 (in 1916 over 17% of expenses were neither assigned nor apportioned).

Several tentative conclusions may be made from these figures:

(1) The proportion of total expenses directly assignable to the freight or passenger service is found to be about two-thirds (formerly it was considered that only about one-half the expenses could be thus assigned).

(2) The ratio of the division of the remaining accounts (largely maintenance of way and structures expenses) does not differ greatly from the ratio of division of the directly-assignable accounts. Thus in 1921 about 73.6% of the directly-assigned expenses were placed against the freight service, while of the balance (assigned by various arbitrary methods as described in the Appendix) about 70.5% were apportioned to the freight service.

(3) It is very difficult to make any practical application of the figures to determine which service is relatively most profitable, because the Commission's Classifications do not provide any careful division of operating revenues as between the two services. A very rough estimate of the respective net revenues for the years 1920-21 is as follows (millions of dollars):

	1920	1921
Net revenue — Freight service.....	56	705
Net revenue — Passenger service.....	256	211

Both of these years were abnormal, and it is probably unsafe to draw any conclusions from the above figures, though the results for 1921 are probably closer to normal

than those for 1920. The 1921 figures would seem to show that the two services were about equally profitable in that year, considering the relative investment.

Results obtained by the use of the Commission's separation of expenses have, however, been employed tentatively in several rate cases: the Western Passenger Case of 1915,<sup>1</sup> the Railway Mail Pay Case<sup>2</sup> (already referred to), and the Increased Rate Case of 1920.<sup>3</sup>

In the Western Passenger Fare Case an interesting analysis of the physical units employed in the formula appears in the Commission's decision. The passenger fare increase was opposed by representatives of the State Commissions, who advocated the unit called "gross ton-miles" to separate maintenance of way and structures expenses, while the railroads favored "locomotive ton-miles."<sup>4</sup> The Commission was unable to determine definitely which of the two units was better, and several other methods of dividing expenses were also employed in experimental fashion. The Commission feared that the advocacy of the two special units by the opposing parties in the case had been caused by their respective interests in the matter of passenger fares. The use of gross ton-miles to divide expenses made the passenger service appear rather prosperous, while locomotive ton-miles tended to give it a poverty-stricken appearance by throwing a greater proportion of total expenses against the service. This was clearly indicated by the results of the assignment of maintenance of way and structures expenses to the passenger service for the Chicago & North Western Railway, on various bases, for the year 1914:<sup>5</sup>

<sup>1</sup> 37 I.C.C. 1.

<sup>2</sup> 56 I.C.C. 1.

<sup>3</sup> 58 I.C.C. 240.

<sup>4</sup> Gross ton-miles is the total weight of the train times the mileage; locomotive ton-miles the weight of the locomotive times the mileage.

<sup>5</sup> Summarized from Tables 14-15, p. 21 (37 I.C.C.).

	PER CENT OF M.W.S. ASSIGNED TO PASSENGER SERVICE
Gross-weight basis .....	29.3
Locomotive ton-mile basis .....	42.0
Locomotive tractive-power basis .....	42.8
Car-mile basis .....	22.2
Wear on gross ton-mile, weather on car-mile basis .....	24.6
Wear on gross ton-mile, weather on net ton-mile basis .....	16.7

It was admitted by all concerned that deterioration, due to the effects of weathering, causes a large part of the expenses for maintenance of way and structures. Various percentages of the total — sixty, seventy, or eighty — were mentioned, but the Commission decided "that these assumptions rest on uncertain ground."

The use of locomotive ton-miles was advocated by the railroads on the ground that the "greater speed of the passenger train creates a greater degree of wear upon the track and other structures than would be the case were the passenger trains run at the same speed as the freight trains. Inasmuch as this greater speed for passenger trains necessitates more power than would be required were the speed less, it is assumed that the weight of the passenger locomotives bears some direct relation to both the weight and the speed of the trains they draw. The locomotive ton-mile, therefore, to a certain extent measures the work done by the engines in each class of service, and to a certain extent forms a measure of the wear on track structures."<sup>1</sup>

The railroads had not stressed the point that freight trains are longer and heavier than passenger trains, and that this greater weight and wheelage might largely offset the factor of greater speed in the passenger train. That the two factors tend to offset each other was indicated by the discovery of the Commission that an apportionment of expenses on the basis of train mileage gave about the same result as the use of the more elaborate unit, engine ton-mileage.

<sup>1</sup> 37 I.C.C. 18.

The Commission finally adopted (as may be noted by an analysis of the 1920 Rules in the Appendix) the basis of locomotive fuel costs as a basis for division of the greater part of maintenance of way and structures expenses. The advantages of this method, combining as it does the elements of speed, weight, and tractive-effort, have been carefully analyzed by Professor William J. Cunningham.<sup>1</sup>

In the 1920 Rate Case, the following extract from the Commission's decision will illustrate the use made of certain cost figures compiled with the aid of the 1920 Rules:<sup>2</sup>

Following request of counsel for certain shippers, the carriers provided for the record an analysis of the freight and passenger earnings and expenses for certain designated railway companies for the calendar year 1919. In making this analysis, the expenses that could not be allocated solely to freight or passenger traffic were apportioned generally in accordance with instructions issued by us on January 1, 1920. A recapitulation of the figures showing the ratio of freight and passenger service expenses to freight and passenger revenues is as follows:

RAILROAD	OPERATING RATIO, FREIGHT SERVICE	OPERATING RATIO, PASSENGER SERVICE
Atchison, Topeka & Santa Fé.....	74.53	67.84
Atlantic Coast Line.....	89.54	80.21
Baltimore & Ohio.....	97.88	75.96
Chicago & North Western.....	90.41	75.93
Chicago, Burlington & Quincy.....	85.80	67.98
Erie System.....	95.74	89.72
Great Northern System.....	80.70	84.08
Louisville & Nashville.....	95.30	76.90
New York Central.....	91.45	60.22
Cleveland, Cincinnati, Chicago & St. Louis.....	83.45	63.84
Pennsylvania Railroad, East.....	98.16	99.16
Michigan Central Railroad.....	81.20	58.50
Southern Railway.....	98.50	78.40

<sup>1</sup> "The Separation of Railroad Operating Expenses between Freight and Passenger," in *Quarterly Journal of Economics*, vol. XXXI, February, 1917.

<sup>2</sup> 58 I.C.C. 240-41.

It will be noted that in the great majority of instances, the operating ratio was decidedly more favorable for the passenger traffic than for the freight traffic. However, there appears to be a wide discrepancy between the figures presented for the various lines, and too much reliance should not be placed upon this showing. Resumption of more frequent train service will tend to increase the operating ratio for passenger traffic. The carriers contend that it is uncertain whether an increase in the general level of passenger fares will yield increased revenue proportionate to the increase in the fare level, because of possible reduction in travel following a material increase in fare.

The foregoing would seem to indicate that such increase as is approved upon passenger traffic may properly be less than the percentage increase applied to freight traffic.

In spite of the practical use thus made by the Commission of its assignment of expenses, many railroad men — perhaps we may say the majority — are still prejudiced against the development of cost-accounting formulæ for guidance in rate-making. This objection is partly due to the cost of preparing statistics on a large scale, and possibly also to the preference of some individual roads for such cost bases or efficiency tests as they have themselves devised. Dr. Julius Parmelee, Director of the Bureau of Railway Economics, has well described the situation:

Whereas a rough-and-ready method of apportionment may furnish a railway executive with information regarding the operations of his road that will serve as a standard of judgment from year to year as to the *relativity* of costs, it is far from certain that even a more refined method would supply exact data as to actual *unit* costs. This is particularly true when the same method is applied (again quoting the railway accounting officers) "to all carriers; to the same carriers under all conditions; and to all divisions of the same carrier."

It certainly does not seem without significance that the railways, nearly half of whom maintain some form of cost accounting for efficiency purposes on their own systems, have for thirty-two years been quite generally opposed to a uniform system of cost separation applied to all railways alike. Their principal objection,

as we have seen, is based on their skepticism as to the practicability of a uniform method.<sup>1</sup>

The objection that cost figures compiled on uniform rules will not fit the needs of individual roads may be met by the statement that rates are seldom fixed with reference to the condition or needs of the individual road, but rather on the basis of the group showing.

There is, however, at least one instance in which railroad accounting officials have taken an active interest in the development of a complete cost formula along scientific lines — the Central Freight Association formula, developed about seven years ago. This method was an outgrowth of one used originally by the St. Louis-San Francisco Railroad, in what was known as the "Boyle Case" in Arkansas. The same formula was successfully used by the carriers in Oklahoma and Kansas. The Boyle Case was carried to the Supreme Court, and in its decision that Court in effect upheld most of the methods outlined therein for the distribution of expenses. When the question of the adjustment of intrastate freight rates in Ohio and Indiana came up in 1915-16 (partly as a result of the abnormally bad conditions in Central Freight Association territory, referred to in the Five Per Cent Case in 1914), the formula used in the Boyle Case was taken as a basis, and a number of conferences were held between the Central Freight Association lines and the Western roads, in order to eliminate any weaknesses which had developed in the original formula.

In the formula as finally perfected, the scope of the plan for distributing operating expenses was as follows:

1. The assignment or apportionment of Maintenance of Way and Structures, Maintenance of Equipment, Transportation and Miscellaneous Expenses:
  - (a) To States.
  - (b) Between "Line" or hauling, and "Terminal" or station expenses.

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<sup>1</sup> "The Separation of Railway Costs between Freight and Passenger," *Quarterly Journal of Economics* (February, 1920), pp. 359-60.

- (c) Line — between Freight and Passenger.
- (d) Terminal — between Freight and Passenger.
- (e) Line Freight — between State and Interstate.
- (f) Line Passenger — between State, Interstate, and Mail and Express.
- (g) Terminal Freight — between State and Interstate.
- (h) Terminal Passenger — between State, Interstate, and Express.

2. The assignment or apportionment of "Sundry Expenses" (Traffic, General):

- (a) To States.
- (b) Between Freight and Passenger.
- (c) Freight — between State and Interstate.
- (d) Passenger — between State, Interstate, and Mail and Express.

The formula, which is too lengthy to be reproduced with this study, lists all the 108 Revenue and Income accounts and the 174 Operating Expense accounts, with specific rules under each account for making each of the eight divisions or apportionments indicated above. This is not quite so formidable as it sounds, since in many instances groups of accounts could be bracketed. In some cases, also, the nature of the account made direct allocation possible without recourse to any rule of assignment. The rules for apportionment were about fifty-five in number, making use of a great number of statistical units, such as —

Number of cars handled.

Respective values of freight and passenger cars.

Car mileage.

Car foot-mileage (length of cars times mileage).

Tons of traffic originating and terminating at each station.

Number of locomotives, and value.

Locomotive mileage both by units and by ton-miles.

Train miles.

Number of state and interstate passengers originating and terminating in each station.

Passenger miles.

Ton-miles (subdivided according to the nature of the business).

Time studies for trains.

Switching locomotives, mileage and station employees.

Special data on tracks and facilities — showing character and value of different facilities used in the various services, so far as determinable.

More recently a separate formula has been developed by the same roads (the C.C.C. & St.L. and the P.C.C. & St.L.) for the assignment of certain operating expenses to find the cost of handling freight traffic at terminals. This formula was largely an outgrowth of the previous one, making a more specific application of certain methods involved. It was used by the carriers in the I.C.C. Case known as I. & S. Docket 965, the outgrowth of which was the Disque Class-Rate Scale. Since the latter case the Central Freight Association lines have also successfully used the formula in the Refrigeration Case, in which reparation of about \$3,000,-000 was involved.

In the further development of a scientific formula for distributing railway costs it is to be hoped that future research will be conducted along practical lines to determine points such as (1) the relative importance of the weather factor and the traffic density in maintenance of way and structures; (2) the relative effects of weight and speed on the wear of rails (especially at curves and switches); (3) the extent to which credits should be allowed to the freight service for work performed for the benefit of the passenger service, and *vice versa*;<sup>1</sup> (4) the best method of estimating terminal and loading costs for different kinds of traffic.

Only with the aid of this and other scientific data can formulæ be worked out with sufficient accuracy to measure discriminations in the various branches of the freight service, and obtain effective revision of classifications and tariffs.

<sup>1</sup> This point, emphasized by Professor H. C. Adams in the Post Office Case as an inherent obstacle to the development of a correct cost formula, has not yet been analyzed by the Commission. In its 1920 Rules the roads are specifically ordered not to make such credits "until further notice." An instance in the freight service is the carrying of company fuel; in the passenger service, the carrying of freight employees on passes.

## CHAPTER XIII

### TO WHAT EXTENT SHOULD DISCRIMINATIONS BE ELIMINATED OR MODIFIED?

WE attempted in previous chapters to clear the ground of false logic in regard to value of service and discrimination. We found that, *a priori*, there is no economic justification for the discrimination; but that industry has largely accommodated itself to the present discriminatory system, especially with regard to long-and-short-haul rates, which condition tends to make the discrimination "reasonable." To change from a practical discriminatory basis to a theoretical cost plan would in effect mean discrimination against "vested interests" in the present industrial system.

Any immediate and drastic modification of the freight rate system would create great changes in the flow of traffic. It would break up many of the traffic relationships which bind together producer, middleman, and consumer. These relationships determine whether a producer in one locality can undersell his competitor in another locality; they decide whether an industry in a certain place can successfully reach its markets or secure its raw materials; they influence the location of traffic "gateways" and export centers. If many industries should be simultaneously confronted with the problem of readjusting their prices, markets, and inventory costs, it is obvious that the country would be thrown into such turmoil that a prolonged period of industrial depression might be the result.

Moreover, it appears that rates on the average show a remarkably close approximation to cost of transportation, in so far as the latter may be tested by traffic density; and that the general level of rates is now being regulated by the

Interstate Commerce Commission with due regard to basic changes in costs and the return on the investment.

Facts and conditions being as they are, then, is there any warrant for disturbing the present system? Even though we desire a cost basis for rates, and were willing to pay the penalty in industrial disturbance, is it not clear that accounting progress to date has been too slow to justify setting up such a basis at the present time?

The problem of adjusting rates on farm products (and especially on wheat) has been much discussed recently in connection with politico-economic agitation by agricultural interests. It should be realized that, unless the principles embodied in the Esch-Cummins Act are to be abandoned, any sweeping reduction in rates on farm products will have to be offset by increases in rates on other classes of freight. Possibly such a readjustment could be accomplished along broad lines without greatly disturbing industry; but the issue is one which can hardly be satisfactorily solved along political lines and without regard to underlying economic problems.

The feeling of the writer is that any change in the group rates must be worked out carefully and slowly and that no drastic change in the rate system as a whole should be planned until we possess more comprehensive statistical knowledge of traffic conditions. During the past ten years, and especially during the war, considerable progress was made in the development of new statistical units: but these units (such as average car-miles per day, percentage of equipment in bad order, etc.) pertained wholly to operating efficiency. No new data on which to base an analysis of traffic have yet been introduced in the Statistical Reports of the Interstate Commerce Commission. It would be most interesting to know the proportion of carload and less-than-carload tonnage for the various classes of manufactured goods now listed. The ton-miles and the average ton-mile revenue should be compiled for all the commodity

groups for which tonnage figures are now reported. Distance tariffs should also be analyzed in order to study the effects of long-and-short-haul rates. In other words, we should be able to classify rate groups in relation to basic operating conditions. The railroads would doubtless object to furnishing such information on the ground of cost of preparation, but they would find the figures of great practical value, and any road large enough to use electric tabulating machines should be able to compile the data from copies of waybills without great difficulty. For experimental purposes, sufficient data might be obtained from reports of roads with \$25,000,000 gross revenues or over, the smaller companies being excused from reporting.

These traffic figures, together with a fairly accurate division of expenses (1) between services and (2) between terminal and line, would help the Interstate Commerce Commission to sort out the most obvious cases of discrimination and apply corrective measures.

Certain rate reforms to which attention might be directed are the following:

1. A uniform classification for the whole country should replace the three classifications now in existence. The use of special commodity rates might be extended to take care of any irregularities due to territorial traffic conditions (e.g., cotton in the South). For many years the railroads have been working on plans for a uniform classification, and these should be completed as soon as possible.
2. Notable discriminations due to the long-and-short-haul principle should be ironed out. To some extent such discriminations are now justified by the reduced cost incident to the large volume of traffic to large cities: but competition is still doubtless the main factor (especially with respect to transcontinental traffic in competition with steamship transportation via the Panama Canal).

3. Terminal costs should be charged against that part of the traffic for which they were incurred. If it is impracticable to adopt a separate terminal charge under our present system, "tapering" distance rates (that is, rates declining with the increase in length of haul) might be used.
4. Concessions in freight rates should be allowed where a large volume of traffic is received from one shipper. Up to the present such concessions have always been regarded as rebates in this country, though recognized as legitimate in Germany. The distinction between carload and less-than-carload rates should be extended. Where a solid train-load of freight is offered by a shipper, a reduction in the rate should be allowed; if regularly scheduled solid train-loadings are possible, still further reduction would be justified by the economies of handling such traffic. The advantages of large-scale production would thus be extended, to the benefit of the general buying public. While small shippers would doubtless complain that they were penalized under such a system, there would be little basis for complaint save in cases where monopoly might be encouraged.

But the necessity of making haste slowly in reforming the present rate system is illustrated by the effects of rate changes in recent years. The large freight-rate increase allowed by the Interstate Commerce Commission in 1920, although applied quite uniformly to the whole rate structure, did not affect all industries alike. While a general burden was laid upon the marketing of all goods at a peculiarly inappropriate time, the effects were particularly bad in the case of agricultural products — or, at least, the complaint from the rural regions was the most vocal — and it was found necessary to lower rates on wheat and other grains so that the farmers might ship their crops to market.

Not only were different industries affected in different degrees, but there was a considerable change in the routing of goods. One instance of this was the shifting of wheat export traffic from seaboard to Gulf ports.

A uniform or flat rate increase is likely to fall most heavily on (1) low-grade bulky traffic, particularly when produced in low-cost mines or mills, because the freight charge is such a large part of the selling price at the point of delivery; (2) long-haul traffic, such as vegetables and fruits moving from California or Florida to New York; and (3) rail traffic moving in competition with steamship, such as transcontinental traffic competing with steamship transportation via the Panama Canal (especially at the present time because of the abnormally low rates for ocean transportation).

In future the Commission will doubtless take greater care, in ordering a general rate increase, to study its probable immediate effect on industry, particularly in relation to the marketing of agricultural products. A very pertinent question, frequently overlooked, is — will an increase in rates on any particular commodity be paid by the shipper or the consumer? In a commodity production of which is subject to international competition, such as wheat, the freight rate is usually, in effect, paid by the producer, and it therefore directly affects his profits: while in the case of a commodity such as anthracite coal, any increase in rates can be “passed along” to the consumer without great difficulty.

From the foregoing discussion, we draw these conclusions: The present discriminatory rate system is far from perfect, but this does not prove the advantage of introducing a new rate system based on cost of service. To attempt the substitution of an arbitrary cost system would be dangerous, first, because it would disrupt the present system of industrial relationships, and, second, because

much work still remains to be done in the development of cost-accounting technique and traffic statistics. Moreover, while a cost system would be an ideal basis for rates in a well-balanced industrial system, the present system is marked by great inequalities in the distribution of population and productive facilities. If, therefore, important changes are to be planned in the present rate system, the sole object should not be to level rates to a cost-of-service basis. The rate system should also conform to, and serve the purpose of, those national policies deemed essential to greater economic and social welfare. As with the administration of our postal system, the policy of taxation, the control of banking, and other prerogatives exercised by the Federal Government, the regulation of rates might be made a powerful instrument to aid in the solution of social problems.

## CHAPTER XIV

### CONCLUSION: THE RATE SYSTEM IN RELATION TO ECONOMIC AND SOCIAL PROBLEMS

MANY important economic problems of to-day are related, directly or indirectly, to the railroad problem. Transportation is the second largest individual industry, and may be considered a keystone of the whole economic system, and whatever defects it may develop will weaken the whole structure.

Many social problems are due to economic maladjustments. Poverty and crime are in a considerable degree traceable to abnormal conditions due to congestion of population in the large cities. Dean Inge, of St. Paul's, London, regards the city as a breeding-place of social unrest: "I am driven to the conviction that social unrest is an ineradicable disease of town life. . . . Industrialism has thrown the balance of power into the hands of that section which, through no fault of its own, is stricken with an incurable malady. . . . If the disaffection of the town-dweller continues to grow and fester, Democracy may fall, and civilization with it."<sup>1</sup>

This is doubtless an extreme view — political dissatisfaction is not necessarily limited to cities, as indicated recently by the formation of the so-called "agricultural bloc" in Congress. The advantage of better sanitation and health protection, moreover, are in favor of the city, as illustrated by the low death-rate in New York City compared with that in the average rural community. Nevertheless, it is generally admitted that further city growth should be discouraged, and that everything possible should be done to stimulate a "back-to-the-farm" movement.

<sup>1</sup> "Democracy and the Future," *Atlantic Monthly*, March, 1922.

Congestion has been caused largely by the general policy followed in the development of our industrial system, of specialization, concentration, and large-scale production. While such a policy was warranted to a considerable extent by the gain in productive capacity, nevertheless, it has been subsidized and stimulated to an unnecessary degree by low rail rates to the large cities. Frequently the rates to important "gateways" or competitive points have been much lower than those to intermediate cities. The practice of making low rates on low-grade, long-haul traffic has enabled many industries to locate nearer their markets than to the supply of raw materials.

Surely our rate system needs some revision in order to remove gradually this undesirable form of "protection" for industry in congested cities. While the situation is generally realized, any move for reform will doubtless meet with great opposition from chambers of commerce and manufacturers' associations in the larger cities.

President Harding, in his address to Congress delivered December 6, 1921, made an exceptionally clear statement of the whole problem:

The base of the pyramid of civilization which rests upon the soil is shrinking through the drift of population from farm to city. For a generation we have been expressing more or less concern about this tendency. Economists have warned and statesmen have deplored. We thought for a time that modern conveniences and the more intimate contact would halt the movement, but it has gone steadily on. Perhaps only grim necessity will correct it, but we ought to find a less drastic remedy.

The existing scheme of adjusting freight rates has been favoring the basing points until industries are attracted to some centers and repelled from others. A great volume of uneconomic and wasteful transportation has attended, and the cost increased accordingly. The grain-milling and meat-packing industries afford ample illustration, and the attending concentration is readily apparent. The menaces in concentration are not limited to the retarding influences in agriculture. Manifestly the conditions and terms of railway transportation ought not to be permitted to increase this unde-

sirable tendency. We have a just pride in our great cities, but we shall find a greater pride in the nation, which has a larger distribution of its population into the country where comparatively self-sufficient smaller communities may blend agricultural and manufacturing interests in harmonious helpfulness and enhanced good fortune.

Such a movement contemplates no destruction of things wrought, of investments made, or wealth involved. It only looks to a general policy of transportation of distributed industry and of highway construction to encourage the spread of our population and restore the proper balance between city and country. The problem may well have your earnest attention.

The problems of agricultural welfare can hardly be over-emphasized. Periods of unemployment in the cities have not caused any noticeable drift of population back to the country. The proportion of tenant-farmers is increasing. It is generally realized that the earning power of the small independent farmer must be increased and stabilized. Large sums are appropriated by the Governments, Federal and State, for educational propaganda, to combat insect pests and to introduce improved species of plants. Moreover, the problem of agricultural credits is rapidly being solved through the organization of joint-stock banks and by the extension of special aid, such as that rendered by the War Finance Corporation. But one phase of the agricultural problem has been neglected — little effort has been made to frame railroad rates with reference to the efficient marketing of farm products. The Agricultural Department and the Interstate Commerce Commission are now coöperating to frame such a policy, however.

The suggestion that agriculture should be encouraged by rate discriminations raises the issue as to whether other worthy industries might not fairly seek such aid. Our rate system has never been regulated with the end in view of stimulating particular industries, though there is no good reason why the protective principle should not be applied in railway rates as well as in foreign trade tariffs, provided

the burden of protection should be carried by a large number of roads. But the difficulties and dangers, both industrial and political, in attempting to upbuild particular industries through the practice of rate discrimination are too evident to require detailed discussion.

Rate differentials to seaports have long existed for the express purpose of subsidizing foreign trade, and recently the Shipping Board issued an appeal for new rate concessions, not only that foreign trade might be stimulated, but that our shipping industry might be restored to some measure of prosperity. The further development of foreign trade is doubtless important, though the advantage of framing a more comprehensive scheme of differentials than now in operation seems doubtful so long as Congress maintains its present position on the tariff issue. With international finances in their present relations, foreign shipments cannot effectively be stimulated without providing for a return flow of goods.

An economic problem of prime importance is that of maintaining adequate and uninterrupted railroad service. In the spring of 1920 a series of "outlaw" strikes among railroad employees took place. Some congestion of traffic already existed, owing to shortage of rolling-stock. The result was a general slowing down of the whole industrial machinery, creating "frozen credits" in the goods held in transit. The situation was principally due to the delay in adjusting rates and wages.

But when increased wages and rates became effective several months later, a period of industrial deflation had just set in. The burden of increased rail rates, added to the inefficiency of labor and the high cost of credit, seriously increased production costs at a most inopportune time. Many industrial companies had built up large inventories in the general belief that the prosperity of 1919 would continue. But the buying public finally realized that prices could not continue to advance and that a decline could be

forced by a "buyers' strike." As the move gathered headway, on the general principle of mob psychology, commodity prices fell faster than at any time since the Civil War, resulting in huge inventory losses for many companies. It is generally admitted that only the Federal Reserve System saved the country from widespread industrial bankruptcy during the winter and spring of 1920-21.

It is evident, then, that railroad rates must be fixed, not alone with an eye to maintaining an efficient transportation service, but with careful regard for the general trend of economic affairs. Transportation is such a vital factor in the economic life of the country that rate-making becomes a matter of industrial statesmanship. When rates as a whole are modified to conform to railroad earning power, the revisions should be made more promptly than in the past. They should be made to synchronize as closely as possible with changes in the general level of prices and wages.

In considering the ramifications of the railroad rate problem, the position of the private investor must not be overlooked. Railroad investors have suffered great losses during the past decade because rates have been insufficient to yield profits corresponding to those obtainable in other industries.<sup>1</sup> In spite of the general feeling of hostility toward the railroad "interests," still evident in the Middle West, the fact cannot be ignored that railroad securities are widely held by small investors. These investors have never, until recently, been adequately represented in cases before Congress or the Interstate Commerce Commission.<sup>2</sup>

The Esch-Cummins Law now gives adequate protection to the investor's interest, and the Commission has shown its desire to uphold the spirit of the law as well as its letter;

<sup>1</sup> The total decline in security values amounted to several billion dollars.

<sup>2</sup> The Association of Railroad Security Owners, headed by Mr. S. Davies Warfield, President of the Seaboard Air Line, was largely instrumental in obtaining passage of the Esch-Cummins Law.

but at this time there is a movement on foot in Congress on the part of the "agricultural bloc" to repeal the most valuable feature of the law — the so-called "guarantee" provision. It is to be hoped that the move will fail, not only because of the necessity of protecting the rightful equity of investors both large and small, but because of the danger that the railroads will be seriously hampered in their future financing if profits are held too low.

Another important problem affecting our whole economic system is that of railroad wages. The machinery for the adjustment of railway labor problems is still far from perfect. While the wage problem has been placed in the hands of an independent board, the Commission is still vitally interested in the matter, for wages and rates are closely related. It is clear to all who have followed the trend of events that, under a system of private ownership of railroads, the regulation of rates and of wages must be synchronized — that is, no important change can be made in one without a corresponding change in the other. Moreover, railroad wages must conform to the general level of wages in other industries and the general standard of living throughout the country.

The best solution would, therefore, seem to be to abolish the Railway Labor Board and transfer its powers to the Interstate Commerce Commission. Congress should, however, lay down a set of basic principles for wage regulation corresponding to those laid down for rate regulation in the Esch-Cummins Law.

The interests of shippers, investors, and railroad employees seem to be almost continually involved in a triangular conflict. To adjust the conflicting rights and claims of the three groups calls for statesmanship — not mere interpretation of law. The Interstate Commerce Commission now has jurisdiction over rates and security issues. If wages and labor conditions should also be brought under its review, unified control of all the conflicting agencies in

transportation would exist for the first time. The usual argument against such a course — that the Commission would be overburdened with work — does not carry much weight. With proper internal organization, the Commission can easily take over duties which will simply round out its natural sphere of activity. The principal difficulty is to obtain men of sufficiently high ability to serve as Commissioners.

To summarize: there are five outstanding problems the solution of which may be aided by a scientific revision of the present rate system:

1. *The proper distribution of population between city and country.* Further concentration of industry may be prevented, and some relocalization of existing industries effected, by rational application of the cost principle to distance rates and the development of a separate terminal charge, but due attention must be given to protection of vested interests and preservation of commercial stability. The encouragement of agriculture will meet with less opposition, but care must be taken that rate discrimination in favor of agricultural products does not go beyond the end sought: for, as with the tariff, railway rates may easily become a tax upon the livelihood of the poorer classes.

2. *The stimulation of foreign trade.* The present scheme of port differentials, and differentials on export traffic in particular commodities, needs frequent revision, but less attention need be paid to this problem in view of the overshadowing importance of the tariff policy and our general attitude toward foreign credits and the adjustment of international debts, as factors in stimulating foreign trade.

3. *The maintenance of an efficient transportation system.* The question as to whether the railroad "breakdown" of 1920-21 was due to private or public operation of the roads<sup>1</sup> need not concern us, for it seems unlikely that the

<sup>1</sup> This issue arose between the former Director-General, Mr. McAdoo, and several leading railroad executives.

question of Government ownership will become an important political issue, at least for some time to come. If the railroads are assured of fair earnings under normal traffic conditions, as seems probable if the present law is retained, they should have little difficulty in financing their own needs, with the moderate help which the Government will extend under the present scheme.

4. *The synchronization of rate and wage regulation with changes in commodity prices.* Wages were advanced ahead of rates during and following the war; rates were finally advanced at a time when commodity prices had begun to fall. This disarrangement of values increased the force of the industrial depression which followed. While it is unlikely that such a drastic disturbance of our economic system will occur again, we should profit by experience.

5. *An equitable adjustment of the rights of railroad employees, investors in railroad securities, and the shipping and traveling public.* We have almost become accustomed to periodic threats and disturbances due to contentions of the three parties at interest. For a time the labor problem threatened to become an unpleasant political issue, and the policy of restriction of output adopted by the railroad unions has brought forth much complaint and dire predictions from railroad executives.

The labor problem is being solved, as usual, by the force of public opinion, which has turned against the unions and forced them to make important concessions. The public is also displaying a much fairer attitude toward the needs of investors. It is to be hoped that there will be no drastic change in the present law, which should function to the advantage of all concerned under normal conditions.

The first two of these five problems are concerned with readjustment of the rate structure: the last three have to do with the rate system as a whole.

In this study, however, only those problems relating to

discrimination and cost of service have been given special attention, because our economic thought along these lines seemed especially in need of clarification, and because the problem of the distribution of population and industry has not thus far received the attention which it merits.

## APPENDIX



## APPENDIX

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# INTERSTATE COMMERCE COMMISSION RULES GOVERNING THE SEPARATION OF OPERATING EXPENSES BETWEEN FREIGHT SERVICE AND PASSENGER SERVICE ON LARGE STEAM RAILWAYS

DECEMBER 1, 1919

*To carriers by steam railway:*

On June 15, 1915, the Commission entered an order prescribing Rules governing the Separation of Operating Expenses between Freight Service and Passenger Service on Large Steam Railways, effective on July 1, 1915. That order was modified on October 23, 1917, by the suspension of the requirements of paragraph 2 and paragraph 3 thereof. It appearing that the public interest requires that the operation of said paragraph 2 be revived, the order following was entered on December 1, 1919, prescribing the annexed revised rules, effective on January 1, 1920. It may be noted that the requirements of paragraph 1, except as to date, are the same as in the above-mentioned order entered on June 15, 1915, and that paragraph 2 makes effective revised rules governing the separation of operating expenses common to freight service and passenger and allied services.

### ORDER

At a General Session of the Interstate Commerce Commission, held at its office in Washington, D.C., on the first day of December, A.D. 1919.

In the matter of Rules governing the Separation of Operating

## Expenses between Freight Service and Passenger Service on Large Steam Railways

*It is ordered, That —*

1. Effective as of January 1, 1920, and thereafter until otherwise ordered, every carrier by steam railway whose operating revenues exceed \$1,000,000 per annum shall classify each of its various items of disbursement relating to operating account according to the relation which such item bears to the freight service and to the passenger and allied services of the carrier. Each such item shall have its character appropriately indicated on the carrier's records according as it relates (a) solely to freight service, or (b) solely to passenger and allied services, or (c) in common to both freight service and passenger and allied services, or (d) to neither freight service nor passenger and allied services. Appropriate subaccounts to provide for the foregoing classification shall be set up under each of the primary operating accounts of the carrier and the results of such classification shall be shown in the annual reports made by each such carrier to the Interstate Commerce Commission. Similar analysis shall be made of every journal entry representing a charge or a credit to an operating expense account and the results of such analysis shall be appropriately indicated on the carrier's records.

2. The operating expenses common to both freight service and passenger and allied services shall be apportioned between the two classes of service in accordance with the annexed "Rules governing the Separation of Operating Expenses between Freight Service and Passenger Service on Large Steam Railways, Issue of 1920," which are hereby approved and made a part hereof; and the results of such apportionment shall be shown in detail for the various primary operating expense accounts in the annual report of each said carrier to the Interstate Commerce Commission.

By the Commission.

[SEAL.]

GEORGE B. McGINTY, *Secretary.*

## RULES GOVERNING THE SEPARATION OF OPERATING EXPENSES BETWEEN FREIGHT SERVICE AND PASSENGER SERVICE

It is expected that carriers will first assign to freight service or to passenger service, including allied services, the operating expenses that are directly or naturally assignable and that this direct assignment will be carried to the fullest extent that is

practicable, except as stated below, without undue increase in accounting expense. The methods indicated under the various accounts are for dividing the common expenses.

The separation should, as far as practicable, be made by operating or accounting divisions, and the aggregate of the divisional separations reported for the year.

### I. MAINTENANCE OF WAY AND STRUCTURES

#### 201. *Superintendence.*

Apportion common expenses according to proportions of accounts 202 to 273, inclusive, excluding common expenses in accounts 227-228 and 247-248.

#### 202-226. *Track Expenses, etc.*

It is essential that maintenance of tracks in yards where a separate switching service is maintained be kept distinct from that of other tracks, the expenses of the exclusively freight or passenger yards being directly assigned. The annual report form will provide by means of subaccounts for showing such yard maintenance separately from other track maintenance.

The maintenance of tracks in yards in which a separate switching service is maintained and which are used in common by freight and passenger services should be divided according to the switching-locomotive miles in the common yards. Expenses of all other tracks should be apportioned according to the proportions of accounts 394 to 396, inclusive. The maintenance of road tracks used exclusively by one service should not be directly assigned to that service unless a corresponding deduction is first made from accounts 394-396 for the fuel or power used on such tracks.

#### 227-228. *Station and Office Buildings.*

Apportion common expenses according to proportions of accounts 202 to 273, excluding common expenses in accounts 227-228 and 247-248.

#### 229-230. *Roadway Buildings.*

Apportion common expenses according to proportions of accounts 202-226.

#### 231-234. *Water and Fuel Stations.*

Apportion common expenses according to proportions of accounts 382 and 394 taken together.

#### 235-236. *Shops and Engine-Houses.*

Apportion common expenses of shops according to proportions of accounts 308, 311, 314, 317, 320, 323, and 326;

of engine-houses according to proportions of accounts 388 and 400.

*237-246. Grain Elevators, Storage Warehouses, etc.*

Assign directly or apportion according to facts in individual instances.

*247-248. Telegraph and Telephone Lines.*

Apportion common expenses according to proportions of accounts 202 to 273, excluding common expenses in accounts 227-228 and 247-248.

*249-250. Signals and Interlockers.*

Apportion common expenses on basis of transportation service locomotive-miles, including switching locomotive-miles.

*251-266. Power Plants, etc.*

Assign according to the facts in individual instances.

*267-273. Paving, Roadway Machines, etc.*

Apportion common expenses according to proportions of accounts 202 to 226.

*274-277. Injuries to Persons, etc.*

When not determined by facts in individual instances these expenses should be apportioned according to proportions of accounts 202 to 273, inclusive, excluding common expenses in accounts 227-228 and 247-248.

*278-279. Maintaining Joint Tracks, etc.*

Joint facilities should, as far as practicable, be treated individually, according to the use made of them by the reporting carrier, regardless of the nature of their use by other carriers, using the appropriate bases indicated for preceding accounts.

## II. MAINTENANCE OF EQUIPMENT

*301. Superintendence.*

Apportion common expenses according to freight and passenger proportions of the aggregate of all primary accounts in General Account II. Maintenance of Equipment, omitting common expenses in accounts 301, and 329-337, inclusive.

*302-303. Shop Machinery.*

Apportion common expenses according to proportions of accounts 308, 311, 314, 317, 320, 323, and 326 combined.

*304-307. Power Plants.*

Apportion common expenses on basis of power used.

**308. Steam Locomotives — Repairs.**

The division should be actual — that is, the repairs of road locomotives assigned exclusively to passenger service should be kept distinct from repairs of road locomotives assigned exclusively to freight service. In cases in which locomotives are not run exclusively in one service or the other the repairs of each locomotive, or class of locomotives, should be divided according to the mileage of the individual locomotive or class.

Mixed-train locomotive mileage, for the purpose of this account, should be divided on the basis of car-miles in mixed trains.

Repairs of locomotives in yard service should be divided according to the freight and the passenger yard switching locomotive-miles.

**309-310. Steam Locomotives — Depreciation and Retirements.**

Assign directly, as far as practicable, and apportion the unassigned remainder according to the proportions of account 308.

**311-313. Other Locomotives — Repairs, Depreciation, and Retirements.**

Treat in accordance with the methods used for accounts 308-310, substituting, however, the percentages produced from other than steam locomotives.

**314-316. Freight-Train Cars — Repairs, Depreciation, and Retirements.**

Assign directly.

**317-319. Passenger-Train Cars — Repairs, Depreciation, and Retirements.**

Assign directly.

**320-322. Motor Equipment of Cars — Repairs, Depreciation, and Retirements.**

Assign according to service to which motor-equipped cars are assigned.

**323-325. Floating Equipment — Repairs, Depreciation, and Retirements.**

Apportion according to use made of the floating equipment.

**326-328. Work Equipment — Repairs, Depreciation, and Retirements.**

Apportion common expenses according to proportions of accounts 202 to 273, omitting common expenses in accounts 227-228 and 247-248.

**329-331. *Miscellaneous Equipment — Repairs, Depreciation, and Retirements.***

Apportion common expenses according to percentages used to divide common expenses of account 301.

**332-335. *Injuries to Persons; Insurance; Stationery and Printing; and Other Expenses.***

Apportion common expenses according to percentages used to divide common expenses of account 301.

**336-337. *Joint Equipment at Terminals.***

Apportion each class of common expenses on bases prescribed for the corresponding operating expense accounts, as far as practicable. The remainder, if any, should be apportioned according to percentages used to divide common expenses of account 301.

### III. TRAFFIC EXPENSES

**351-359. *Superintendence; Outside Agencies; Advertising; Traffic Associations; Fast-Freight Lines; Industrial and Immigration Bureaus; Insurance; Stationery and Printing; and Other Expenses.***

Assign directly, as far as practicable, and apportion the unassigned remainder on the basis of the directly assigned expenses in this general account.

### IV. TRANSPORTATION — RAIL LINE

**371. *Superintendence.***

Apportion common expenses according to freight and passenger proportions of the aggregate of all primary accounts in General Account IV. Transportation — Rail Line, omitting the common expenses in accounts 373, 376, 390-391, 406, 407, 410-417, and 420.

**372. *Dispatching Trains.***

Apportion common expenses on the basis of transportation train-miles. Mixed train-miles for the purpose of this account should be divided on the basis of car-miles in mixed trains.

**373. *Station Employees.***

Apportion common expenses according to percentages used to divide common expenses of account 371.

**374. *Weighing, Inspection, and Demurrage Bureaus.***

Assign directly.

**375. Coal and Ore Wharves.**

Assign directly.

**376. Station Supplies and Expenses.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**377-389. Yardmasters and Yard Clerks; Yard Conductors and Brakemen; Yard Switch and Signal Tenders; Yard Enginemen; Yard Motormen; Fuel for Yard Locomotives; Yard Switching Power produced; Yard Switching Power purchased; Water for Yard Locomotives; Lubricants for Yard Locomotives; Other Supplies for Yard Locomotives; Engine-House Expenses — Yard; Yard Supplies and Expenses.**

Assign directly, as far as practicable, and apportion the unassigned remainder in accordance with the freight and the passenger yard switching-locomotive mileage.

**390-391. Operating Joint Yards and Terminals.**

Apportion each class of common expenses on bases prescribed for the corresponding operating expense accounts as far as practicable. The remainder, if any, should be divided according to the percentages used to divide the common expenses of account 371.

**392-393. Train Enginemen and Train Motormen.**

Assign directly, as far as possible. Apportion expenses for mixed-train service on the basis of car-miles in mixed trains. Apportion other common expenses on the basis of the direct assignments.

**394. Fuel for Train Locomotives.**

Assign directly, as far as possible. Apportion expenses for mixed-train service on the basis of car-miles in mixed trains. Apportion other common expenses, which should be relatively small, on the basis of the direct assignment. Any abnormal conditions, such as a widely different price paid for fuel in one service as compared with that in the other, should be noted in annual reports.

**395-396. Train Power produced and purchased.**

Apportion common expenses according to purpose for which power is used.

**397. Water for Train Locomotives.**

Apportion common expenses according to proportions of account 394.

**398-399. Lubricants and Other Supplies for Train Locomotives.**

Observe tenor of directions under accounts 392-393.

**400. Engine-House Expenses — Train.**

Expenses at each engine-house should be divided according to the number of engines handled for each service. Where various classes of engines differ considerably in expense of handling at an engine-house, an arbitrary should be adopted representing such variation and the number of engines handled modified accordingly. Mixed-train locomotive expenses should be divided on the basis of car-miles in mixed trains.

**401-402. Trainmen and Train Supplies and Expenses.**

Observe tenor of directions under accounts 392-393.

**403. Operating Sleeping-Cars.**

Assign to passenger.

**404-405. Signal and Interlocker Operation; Crossing Protection.**

Apportion common expenses on the basis of transportation locomotive-miles, including switching locomotive-miles.

**406. Drawbridge Operation.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**407. Telegraph and Telephone Operation.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**408. Operating Floating Equipment.**

Apportion common expenses according to the use made of the floating equipment.

**409. Express Service.**

Assign to passenger.

**410. Stationery and Printing.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**411. Other Expenses.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**412-413. Operating Joint Tracks and Facilities.**

Apportion each class of expense on bases prescribed for the corresponding operating expense accounts as far as practicable. The remainder, if any, should be apportioned according to percentages used to divide common expenses of account 371.

**414. Insurance.**

Apportion common expenses according to percentages used to divide common expenses of account 371.

**415. Clearing Wrecks.**

Assign directly, as far as practicable, according to service in which wreck occurs and not according to responsibility for wreck. Apportion unassigned remainder according to percentages used to divide common expenses of account 371.

**416-417. *Damage to Property and Damage to Live Stock on Right of Way.***

Observe tenor of directions for account 415.

**418. *Loss and Damage — Freight.***

Assign to freight.

**419. *Loss and Damage — Baggage.***

Assign to passenger.

**420. *Injuries to Persons.***

Observe tenor of directions for account 415.

## V. TRANSPORTATION — WATER LINE

Assign directly as far as practicable. Apportion remainder on appropriate units according to local conditions.

## VI. MISCELLANEOUS OPERATIONS

Observe tenor of directions under General Account V. Transportation — Water Line.

## VII. GENERAL EXPENSES

Assign directly, as far as practicable, and apportion remainder according to proportions of accounts 201 to 446.

## VIII. TRANSPORTATION FOR INVESTMENT — CR.

The method of deciding upon the amount of this credit will determine the freight and the passenger proportion.

## CHARGES AND CREDITS BETWEEN SERVICES

Carriers in making apportionments under the preceding rules should not, until further notice, make any allowance for the credit that should be given to the freight service for work performed (such as carrying company fuel) for the passenger service and *vice versa*.



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